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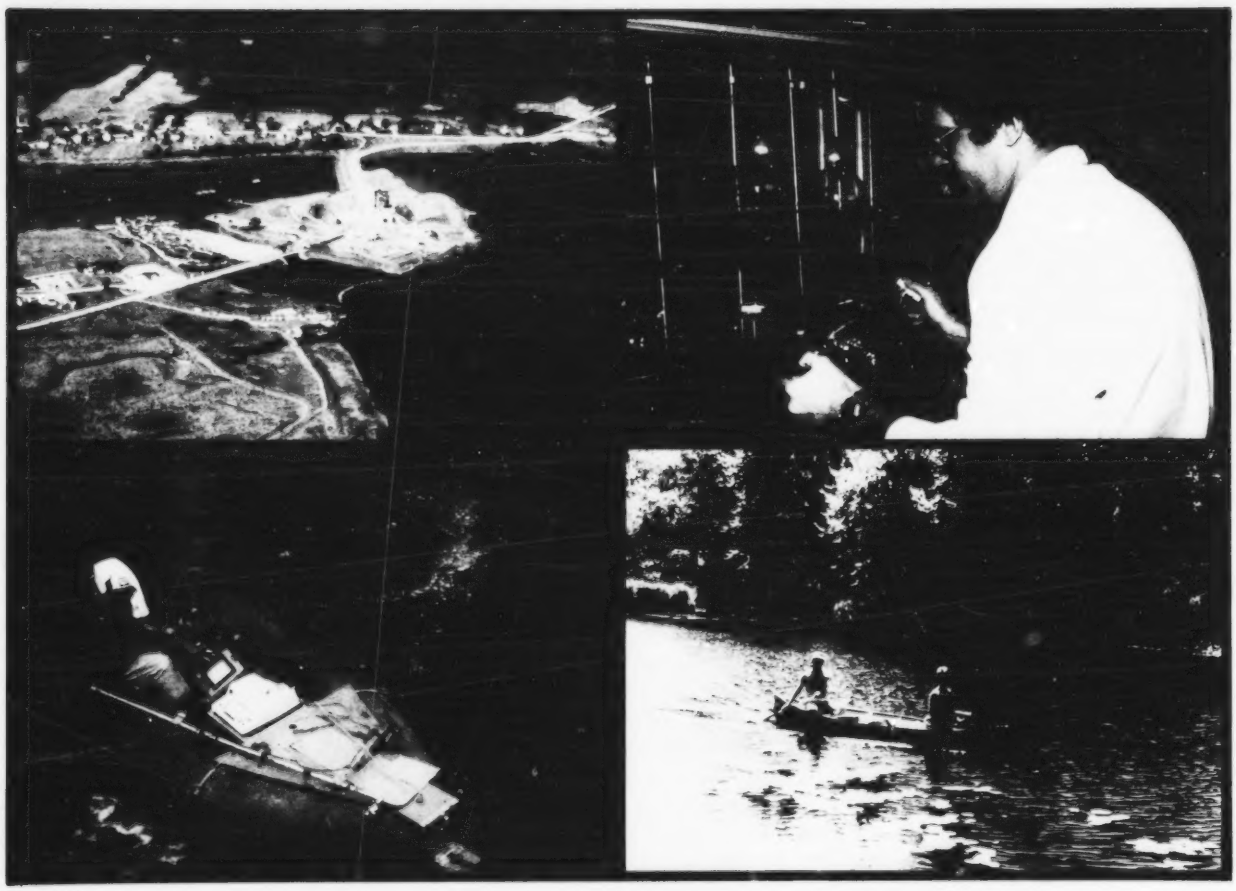
1987/88 St. Croix River Water Quality Report

IWD – AR – WQB – 89 – 148



Canada

INLAND WATERS DIRECTORATE
ATLANTIC REGION
WATER QUALITY BRANCH
MONCTON, NEW BRUNSWICK

1987/88 ST. CROIX RIVER

WATER QUALITY REPORT

IWD-AR-WQB-89-148

INLAND WATERS DIRECTORATE

ENVIRONMENT CANADA

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June, 1989

ABSTRACT

This report presents the results of the 1987/88 St. Croix River water quality monitoring program. Physical parameter values, as well as major ion, nutrient and heavy metal concentrations are given for three sampling stations for the period from November 1987 to November 1988. Water quality objectives for dissolved oxygen and pH were met on all occasions. Provisional data from the Milltown Automatic Water Quality Monitor (AWQM) are presented for the period from January 1988 to December 1988.

Résumé

Ce rapport présente les résultats provenant du programme de surveillance continue de la qualité des eaux de la rivière Sainte-Croix pour 1987-1988. Les résultats d'analyse des paramètres physiques, ainsi que les concentrations mesurées d'ions principaux, de métaux lourds et d'éléments nutritifs, sont présentées pour trois stations d'échantillonnage de novembre 1987 à novembre 1988. Les valeurs de PH et d'oxygène dissous ont toutes rencontrées les objectifs respectifs de la qualité des eaux. Des données provissoires provenant d'un enregistreur automatique de la qualité des eaux installé à Milltown sont aussi présentées pour la période de janvier 1988 à décembre 1988.

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1. INTRODUCTION

The St. Croix River and its tributary, Monument Brook have a reach of approximately 124 km and form the international boundary between New Brunswick, Canada and Maine, U.S.A. In the upper 110 km of the St. Croix River, the water quality is considered to be pristine. The region of concern is a 14 km stretch between Woodland, Me. and Milltown, N.B. which is considered to be a water quality limited segment caused by a major industrial discharge from the Georgia-Pacific Kraft Pulp Mill at Woodland, Me.

The Advisory Board on Pollution Control in the St. Croix was established by the International Joint Commission (IJC) in 1962 to coordinate water quality planning and management efforts in the basin. To assist the board in fulfilling its mandate, the Water Quality Branch conducts systematic water quality sampling in the international portion of the river. The samples are analyzed for physical parameters, major ions, nutrients and trace metals.

The Water Quality Branch in cooperation with the United States Geological Survey (USGS) also receives data for temperature, specific conductance, pH and dissolved oxygen on a real-time basis via satellite retransmission from an automatic water quality monitor (AWQM) at Milltown, Maine. Similarly, river discharge data are received from the USGS gauging station at Baring, Maine.

These data are used in the development of water quality objectives for the St. Croix River with particular reference to the passage of Atlantic Salmon (Salmo salar). To date, only objectives for dissolved oxygen and pH have been established (5.0 mg/L and 60% saturation and 6.0 to 8.5 pH units respectively). By 1978, improvements in the water quality of the lower 14 km stretch of the river had made possible the passage of Atlantic Salmon, and in 1980 a re-introduction program was started.

This report presents the water quality data from three sampling stations in the St. Croix River Basin during the period from November 1987 to November 1988. Also included are the AWQM data for the period of January 1988 to December 1988.

Previous St. Croix River Water Quality reports include Clair (1980), Lockerbie and Cullen (1981), Howell and Lockerbie (1983), Howell and Lockerbie (1984), Howell (1985), Lockerbie (1987) and Bailey (1988).

2. METHODOLOGY

The Water Quality Branch sampled the St. Croix River on seven occasions from November 27, 1987 to November 17, 1988 at three sites in the river basin - Kellyland, Woodland, and Milltown. The St. Croix River at Kellyland station is considered to be pristine and indicative of background water quality whereas the Woodland station is located 200 m below the Georgia-Pacific Pulp Mill effluent outfall and serves to characterize the chemical composition of the effluent after a slight dilution by river water. The Milltown station, 14 km below Woodland provides information on the river water quality after assimilation and dilution of the pulp mill effluent by the river. Sampling station location descriptions are presented in Table 1 and plotted in Figure 1.

The Water Quality Branch sampling was conducted as outlined in "Sampling for Water Quality" (WQB, 1983) and the analytical methods employed are described in the NAQUADAT Dictionary (WQB, 1986). A list of selected water quality parameters, their NAQUADAT codes and detection limits are presented in Table 2. Water Quality Branch, Atlantic Region quality control procedures require that at least 15% of the samples must be collected in triplicate and the preservation blanks must be prepared for each sampling occasion. The results of these QA/QC procedures are not discussed but the data are presented in Table 7.

Beginning in April 1988 the sampling frequency was decreased to approximately 10 week intervals as compared to the frequency of 6 weeks the previous years. Also preservation of metals and phosphorus in the field was discontinued in favour of laboratory preservation.

The hourly data from the USGS AWQM at Milltown were obtained by using a Labarge GOES satellite retransmission platform. For this report, data are listed in daily format with minimum, maximum and mean. In addition to the measured parameters, percent dissolved oxygen saturation has been calculated and included in the tables.

The river discharge data from the Baring gauging station have been similarly formatted and included in the monthly tables. It should be noted that the above data are considered to be provisional. Both these data sets are verified and published by the USGS in annual reports at a later date.

3. RESULTS AND DISCUSSION

3.1 1988 Grab Sample Data versus the Water Quality Objectives

Two specific water quality objectives, with particular reference to fish passage, have been adopted for the St. Croix River Basin. They stipulate that the dissolved oxygen concentration shall be at least 60% saturation or 5.0 mg/L whichever is greater and that the pH of the waters shall be in the range of 6.0 to 8.5 units. A third objective, for limits of bacterial population, has been established for shellfish harvesting purposes and will not be discussed here.

As a result of the small number of samples collected during this sampling period, this report will be primarily a data presentation with little interpretation of the data. Physical parameters, major ion, nutrient and metal data are presented in Tables 3 to 5. Major ion equivalent concentrations are provided in Table 6.

The 1988 Water Quality Branch grab sample data for dissolved oxygen are illustrated in box and whisker plots in Figures 2 and 3. Figure 2 indicates that dissolved oxygen concentrations for the grab samples were well above the Water Quality Objectives of 5 mg/L with median values in the 10 to 12 mg/L range. The lowest dissolved oxygen concentration observed was 6.1 mg/L at Woodland on June 22. As percent saturation (Figure 3), the minimum daily mean values were at the 80 percent mark with median values near 90 percent. As a result of scheduling, no grab samples were collected in July or

August in 1988, the period during which dissolved oxygen concentrations are normally at their lowest.

The pH values met the water quality objective of 6.0 to 8.5 at all sites as illustrated in Figure 4.

3.2 Provisional AWQM data versus the Water Quality Objectives

According to the AWQM data (Appendix I), the daily mean concentrations for dissolved oxygen fell to 6 mg/L in July and August as illustrated in Figure 5. Median values for July, August and September were 6.2, 6.8 and 8.4 mg/L respectfully. In 1988, no dissolved oxygen concentrations fell below the water quality objective of 5.0 mg/L.

A physical scan of the monthly data sheets (Appendix I) also indicates that the pH values were within the 6.0 to 8.5 water quality objective range. For the most part, pH values were nearly neutral ranging from 6.8 to 7.0.

3.3 St. Croix River at Kellyland - Station No. 00NB01AR0013

The St. Croix River at Kellyland sampling station is located 15 km above Woodland and is representative of background water quality. Water temperature ranged from 0.2°C on January 15 to 22.6°C on June 22. Dissolved oxygen concentrations ranged from 8.5 mg/L (97% saturation) on June 22 to 14.3 mg/L (99% saturation) on November 27,

1987. Dissolved oxygen as percent saturation ranged from 79 to 99 percent. pH ranged from 6.5 to 6.8 for the sampling period. The apparent colour ranged from 30-70 Hazen units with a median value of 35.

The background waters of the St. Croix River are dilute, with specific conductance ranging from 19.2 to 33 μS/cm. The dominant cation is calcium (0.125 to 0.210 meq/L) followed by sodium (0.060 to 0.078 meq/L), magnesium (0.048 to 0.071 meq/L) and potassium (0.008 to 0.011 meq/L). The anions are dominated by bicarbonate (0.084 - 0.150 meq/L) followed by sulphate (0.060 - 0.081 meq/L) and chloride (0.042 - 0.062 meq/L).

Concentrations of copper, lead, mercury and cadmium were below the limit of detection on all occasions. Iron and manganese concentrations were 2 to 3 times the detection limit ranging from 0.12 to 0.34 and 0.02 to 0.03 mg/L respectively. Aluminum concentrations ranged from 0.039 to 0.110 mg/L.

Nutrient concentrations were low at Kellyland with nitrate nitrogen and total nitrogen ranging from <0.01 to 0.07 and <0.1 to 0.18 mg/L respectively. Total phosphorus ranged from 0.005 to 0.010 mg/L while dissolved organic carbon ranged from 6.3 to 9.9 mg/L.

3.4 St. Croix River at Woodland - Station No. 00NB01AR0014

This water quality sampling station is located on the United States side of the river approximately 200 metres below the site of the Georgia-Pacific Mill effluent outfall. Samples are collected in the effluent plume and serve to characterize the chemical composition of the effluent after slight dilution by river water.

The temperature of the St. Croix River at the Woodland station is primarily due to the effluent temperature and thus remains high throughout the year (11.5 to 30.6°C). The lowest dissolved oxygen concentration recorded was 6.1 mg/L or 81 percent saturation on June 22, 1988. pH was slightly higher (7.1-7.7 units) at Woodland as compared to Kellyland due to the alkaline nature of the Kraft effluent. The apparent color was greater than 1000 Hazen units on all occasions except one, approximately 25 times the background level. Nonfilterable residue (suspended solids) ranged from 30 to 114 mg/L with a median of 93. Values at Kellyland and Milltown are normally less than the detection limit of 10 mg/L.

The specific conductance at Woodland was approximately 70 times higher than the background station. There has also been a change in the dominance of major ions. Whereas at Kellyland, the cation and anion dominance was Ca>Na>Mg>K and HCO_3>SO_4>Cl respectively, sodium strongly dominates the cations followed by Ca>K>Mg (Table 6) at Woodland. Similarly chloride dominates the anions with sulphate and

bicarbonate nearly proportional. This shift in ion dominance is a result of the Kraft process.

Mercury and cadmium were below or at their respective detection limits while copper (<0.002 to 0.008 mg/L) and lead (0.005 to 0.011 mg/L) were slightly above the detection limit. Iron concentrations were slightly elevated (0.66-0.90 mg/L) while manganese values were about two orders of magnitude greater than those in samples from Kellyland. Extractable aluminum concentrations were very high (3.0 to 6.5 mg/L), which is probably from the use of alum in process water treatment in the mill.

The organic nature of the Kraft Mill effluent is reflected in the elevated concentrations of nutrients. Dissolved organic carbon values, which ranged from 59 to 152 mg/L in 1988, had a mean concentration more than 22 percent higher than those reported in 1986/87 (Bailey, 1988) and 11 percent higher than 1985/86 (Lockerbie, 1987). Total nitrogen and nitrate nitrogen ranged from 2.4 to 11.0 mg/L and 2.4 to 7.5 mg/L respectively. Most nitrogen was in the form of available nitrite/nitrate.

Total phosphorus determinations are not normally made at this station due to analytical interferences.

3.5 St. Croix River at Milltown - Station No. 00NB01AR0001

Fourteen kilometres downstream from Woodland at Milltown, the effluent plume appears to be incorporated into the river water and there is little indication of any horizontal differentiation in water quality (Howell and Lockerbie 1983). This station provides information on the river water quality after assimilation and dilution of the pulp mill effluent by the river.

Water temperatures (0.2 to 22.9°C) were similar to the background station at Kellyland. Apparent color at Milltown ranged from 65-120 Hazen units which represents an approximate 2-fold increase over the values at Kellyland. Dissolved oxygen exceeded the water quality objectives of 5.0 mg/L and 60% saturation on all occasions. It ranged from 7.1 to 13.4 mg/L or 83 to 93 percent saturation. The lowest dissolved oxygen recorded (7.1 mg/L and 83% sat.) was on June 22, 1988. The lowest value at Woodland was also recorded on this date.

Major ion chemistry at Milltown reflects a mixture of the background calcium bicarbonate dominated waters of the St. Croix River and the sodium chloride dominated pulp mill effluent. The specific conductance values were slightly variable ranging from 51 to 150 μS/cm. Sodium was the dominant cation over calcium on all occasions. Chloride was the dominant anion on four of seven occasions, but was exceeded by bicarbonate on the other three.

Mercury and cadmium were not detected at Milltown. Three detection limit values were reported for copper and one for lead. Iron, manganese and aluminum were slightly above levels reported for the background station at Kellyland, the increases presumably the result of the high concentrations observed in the pulp mill effluent.

Nutrient concentrations at Milltown are slightly higher than those observed at Kellyland. Total phosphorus ranged from 0.016 to 0.046 mg/L, nitrite/nitrate from <0.01 to 0.15 mg/L, total nitrogen from 0.11 to 0.25 mg/L and dissolved organic carbon ranged from 7.0 to 10.0 mg/L.

3.6 Milltown AWQM Data

The provisional AWQM data for the period from January to December 1988, and the provisional discharge data from July to December 1988 have been formatted into monthly data sheets and are provided for information only in Appendix I. One format change from the 1987 data sheets should be noted. The fourth column of each parameter represents the number of hours of data used in the calculations. This column previously expressed the daily rate of change of each parameter.

Milltown data corrections have been updated by the USGS to December 31, 1988. Three blocks of data from March 16 to July 15 have been discarded due to technical problems. These have been noted

on the monthly data sheets. According to the USGS, the AWQM operated at 87% for the four parameters during the 1988 water year. The data from November 1 to 5 were lost when the receiving computer in Downsview, Ontario was down.

Besides the down time, two calibration corrections for dissolved oxygen should be noted. Following the installation of a new pump on June 3, dissolved oxygen, according to data received in Moncton, did not function properly until June 7. From June 7 to June 29, a correction factor of 0 to 2.7 was applied to correct for a faulty signal card. This negates the low dissolved oxygen values for the month of June previously reported to the Advisory Board.

A similar correction was applied to dissolved oxygen data from July 15 to August 22. This correction was in response to the installation of a new programmer and probe cleaning. A correction of 0 to +1.2 mg/L was applied to data during this period.

Though the data reported on the monthly data sheets remain provisional, the dissolved oxygen values have been adjusted to compensate for the correction.

For an assessment of the AWQM provisional data for the period from July to September, 1988, graphs for dissolved oxygen and discharge, and dissolved oxygen and temperature are presented in Figures 6 to 8.

Figures 6 and 7 indicate that while river discharge remained fairly constant between 22.6 and 28.3 cms, daily mean dissolved oxygen, as concentration and percent saturation, declined the first half of July and levelled off at 6.0 and 6.5 mg/L (70 to 75% saturation) until early August. By mid-August the increased discharge (Figures 6, 7) probably contributed to an improved temperature regime (Figure 8) and then the natural temperature decline resulted in improvement in dissolved oxygen concentration in the last half of August and September.

4. CONCLUSIONS

During the study period, from November, 1987 to November, 1988, the sampling sites were visited on seven occasions. The water quality objectives for dissolved oxygen (5.0 mg/L and 60% saturation) and pH (6.0 to 8.5 pH units) were met at all sites.

The AWQM provisional data for the period from January, 1988 to December, 1988 have been appended for information. These data have been corrected for technical errors with factors supplied by the USGS. The corrected AWQM data also met the water quality objectives of dissolved oxygen and pH.

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6. TABLES AND FIGURES

TABLE 1: NAQUADAT NUMBERS AND SITE DESCRIPTIONS OF STATIONS SAMPLED ON THE ST. CROIX RIVER

NAQUADAT No.	Site Description
00NB01AR0013	St. Croix River at Kellyland
00NB01AR0014	St. Croix River, 200 m below Woodland Mill on the U.S. side of the river.
00NB01AR0001	St. Croix River at Milltown International bridge - mid-river.

TABLE 2: A LIST OF PARAMETERS, PARAMETER CODES AND DETECTION LIMITS

Parameter	NAQUADAT Code	Detection Limit
Water Temperature	02065S	—
Dissolved Oxygen (meter)	08102S	—
Specific Cond. (field)	02042S	2 µS/cm
pH (field)	10301F	-
Specific Cond. (lab.)	02041L	0.2 µS/cm
pH (lab)	10301L	—
Colour	02011L	—
Turbidity	02073L	—
Calcium	20110L	0.040 mg/L
Sodium	11103L	0.10 mg/L
Potassium	19103L	0.10 mg/L
Magnesium	12107L	0.005 mg/L
Chloride	17209L	0.100 mg/L
Sulphate	16304L	1.00 mg/L
Total Alkalinity	10101L	0.5 mg/L
Extractable Iron	26304P or L	0.050 mg/L
Extractable Manganese	25304P or L	0.010 mg/L
Extractable Copper	29305P or L	0.001 mg/L
Extractable Lead	82302P or L	0.010 mg/L
Extractable Mercury	80315P or L	0.02 µg/L
Extractable Aluminum	13305P or L	0.002 mg/L
Extractable Cadmium	48302P or L	0.001 mg/L
Total Phosphorus	15413P or L	0.005 mg/L
Total Nitrogen	07601L	0.025 mg/L
Nitrate + Nitrite N.	07110L	0.002 mg/L
Dissolved Organic Carbon	06107L	0.4 mg/L

TABLE 3: PHYSICAL PARAMETERS AND MAJOR ION CONCENTRATIONS (MG/L)
FOR THE ST. CROIX RIVER STATIONS AT
KELLYLAND, WOODLAND AND MILLTOWN

0	1 SAMPLING STATION	2 SDATE	3 STIME	4 SUB.	I.D.	5 WATER TEMP	6 FIELD PH	7 FIELD COND	8 D.O. MG/L	9 D.O. % SAT	10 LAB COND	11 LAB PH	12 T.ALKAL.
1	00NB01AR0013	27-NOV-87	1440			0.5	7.6	33.0	14.3	99	37	6.8	[illegible]
2	00NB01AR0013	15-JAN-88	925		145	0.2	7.2		11.5	79	33	6.7	[illegible]
3	00NB01AR0013	26-FEB-88	925	T145		0.5		32.0	11.8	82	36	6.5	6.9
4	00NB01AR0013	26-FEB-88	930	T145		0.5		32.0	11.8	82	36	6.5	6.9
5	00NB01AR0013	26-FEB-88	935	T145		0.5		32.0	11.8	82	36	6.5	7.0
6	00NB01AR0013	13-APR-88	1100		145	3.5	7.2	25.0	13.1	98	26	6.5	4.2
7	00NB01AR0013	22-JUN-88	1000		145	22.6	6.7	32.0	8.5	97	32	6.5	6.6
8	00NB01AR0013	14-SEP-88	1010	T145		16.7	7.1	32.0	9.1	94	32	6.7	7.4
9	00NB01AR0013	14-SEP-88	1020	T145		16.7	7.1	32.0	9.1	94	31	6.7	7.2
10	00NB01AR0013	14-SEP-88	1015	T145		16.7	7.1	32.0	9.1	94	32	6.7	7.5
11	00NB01AR0013	17-NOV-88	1025		145	4.8	6.4	19.2	12.4	97	33	6.6	7.0
12													
13	00NB01AR0014	26-NOV-87	835			17.0	7.7	2550.0	9.0	93	2570	7.1	230.2
14	00NB01AR0014	15-JAN-88	1000	T145		13.0	7.9		12.2	115	2520	7.5	
15	00NB01AR0014	15-JAN-88	1005	T145		13.0	7.9		12.2	115	2470	7.6	251.9
16	00NB01AR0014	15-JAN-88	1010	T145		13.0	7.9		12.2	115	2440		
17	00NB01AR0014	26-FEB-88	1000		145	16.0		2600.0	10.0	100	2560		
18	00NB01AR0014	13-APR-88	1135		145	11.5	7.4	1600.0	10.2	93	2200	7.4	196.5
19	00NB01AR0014	22-JUN-88	1045	T145		30.6	7.5	2560.0	6.1	81	2610		
20	00NB01AR0014	22-JUN-88	1047	T145		30.6	7.5	2560.0	6.1	81	2610		
21	00NB01AR0014	22-JUN-88	1049	T145		30.6	7.5	2560.0	6.1	81	2610		
22	00NB01AR0014	14-SEP-88	1055		145	21.4	7.6	2200.0	7.8	87	2260	7.6	244.3
23	00NB01AR0014	17-NOV-88	1110		145	16.2	7.7	1910.0	9.7	97	2140	7.7	246.5
24													
25	00NB01AR0001	27-NOV-87	935			0.5	7.1	110.0	13.4	93	117	6.8	13.3
26	00NB01AR0001	27-NOV-87	937			0.5	7.2	110.0	13.4	93	117	6.9	13.1
27	00NB01AR0001	27-NOV-87	939			0.5	7.2	110.0	13.4	93	118	6.9	13.1
28	00NB01AR0001	15-JAN-88	1100		145	0.0	7.4		12.1	83	84	6.8	10.8
29	00NB01AR0001	26-FEB-88	1030		145	0.5		58.0	12.2	85	61	6.7	10.1
30	00NB01AR0001	13-APR-88	1210	T145		3.5	7.4	53.0	12.8	96	52	6.7	6.7
31	00NB01AR0001	13-APR-88	1215	T145		3.5	7.4	53.0	12.8	96	52	6.6	6.7
32	00NB01AR0001	13-APR-88	1220	T145		3.5	7.3	53.0	12.8	96	51	6.7	6.6
33	00NB01AR0001	22-JUN-88	1125		145	23.8	7.1	155.0	7.1	83	150	6.7	18.6
34	00NB01AR0001	14-SEP-88	1125		145	16.0	7.3	64.8	8.2	82	64	6.7	11.1
35	00NB01AR0001	17-NOV-88	1150	T145		5.4	7.4	62.4	11.8	93	58	6.6	10.1
36	00NB01AR0001	17-NOV-88	1155	T145		5.4	7.2	62.4	11.8	93	59	6.7	10.3
37	00NB01AR0001	17-NOV-88	1201	T145		5.4	7.0	62.4	11.8	93	60	6.7	10.2

TABLE 3: PHYSICAL PARAMETERS AND MAJOR ION CONCENTRATIONS (MG/L)
FOR THE ST. CROIX RIVER STATIONS AT
KELLYLAND, WOODLAND AND MILLTOWN

0	13 COLOUR	14 TURBIDITY JTU	15 DISS NA MG/L	16 DISS CA MG/L	17 DISS K MG/L	18 DISS MG MG/L	19 CL-IC MG/L	20 DISS SO4 MG/L	21 SO4-IC MG/L	22 RESIDUE MG/L
1	40	1.0	1.7	4.2	0.33	0.87	1.9	4.7	3.7 L10.	
2	30	0.7	1.6	3.4	0.35	0.86	3.0	4.4	3.6 L10.	
3	35	0.7	1.7	3.9	0.34	0.79	2.2	4.5	3.9 L10.	
4	35	0.8	1.7	3.9	0.34	0.79	2.2	4.4	3.9	
5	35	0.7	1.6	3.9	0.35	0.79	2.2	4.4	3.9	
6	50	1.8	1.4	2.5	0.31	0.58	1.8	3.6	3.2 L10.	
7	35	0.7	1.7	3.5	0.34	0.62	1.5	3.6	2.9 L10.	
8	40	0.9	1.6	3.4	0.34	0.72	1.7	3.5	3.1 L10.	
9	35	0.8	1.6	3.4	0.34	0.72	1.6	3.7	3.0 L10.	
10	40	0.9	1.5	3.4	0.44	0.72	1.8	3.4	3.1 L10.	
11	70	0.9	1.8	3.5	0.37	0.81	2.2	4.7	3.6 L10.	
12										
13	G1000.	9.0	500.0	86.0	22.80	6.20	740.0	308.0	240.0	74
14	G1000.	31.0	489.0	72.0	20.70	4.90	460.0	326.0		93
15	G1000.	33.0	467.0	72.0	20.30	4.80	450.0	318.0	300.0	
16	G1000.	33.0	467.0	71.0	2.10	4.70	430.0	328.0	290.0	
17	G1000.	3.1	520.0	61.0	23.00	5.00	410.0	316.0	290.0	114
18	G1000.	9.5	399.0	66.0	17.00	4.80	410.0	241.0	240.0	70
19	G1000.	5.1		72.0		5.60	574.0	240.4	228.0	107
20	G1000.	4.7		72.0		5.50	563.0	243.0	235.0	113
21	G1000.	5.0		70.0		5.60	545.0	243.0	226.0	109
22	G1000.	8.5	467.0	52.0	29.00	4.50	570.0	285.0	295.0	37
23	1000	6.7	400.0	73.0	19.00	5.30	460.0	208.0	213.0	30
24										
25	80	3.2	15.2	6.2	0.96	0.93	17.9	11.0	10.3 L10.	
26	80	3.3	15.2	6.1	0.96	0.94	18.0	11.0	10.3 L10.	
27	80	3.1	15.2	6.1	0.97	0.94	17.8	10.9	10.7 L10.	
28	75	2.9	9.6	4.6	0.72	0.76	10.3	9.9	8.7 L10.	
29	65	2.0	6.4	4.4	0.55	0.84	6.2	7.7	6.7 L10.	
30	70	2.7	5.5	3.3	0.48	0.64	6.2	6.2	5.6 L10.	
31	70	2.8	5.5	3.3	0.48	0.64	6.2	6.2	5.6 L10.	
32	70	2.8	5.5	3.3	0.48	0.64	6.2	6.2	5.6 L10.	
33	120	1.7		6.4		0.87	22.4	13.0	12.2 L10.	
34	70	2.0	6.8	4.5	0.69	0.83	6.3	7.0	6.1 L10.	
35	90	1.4	5.9	4.6	0.59	0.87	6.8	6.9	5.9 L10.	
36	90	1.4	5.8	4.5	0.58	0.86	6.2	6.6	5.9 L10.	
37	90	1.3	5.9	4.4	0.60	0.89	6.3	6.6	5.9 L10.	

TABLE 4: NUTRIENT CONCENTRATIONS (MG/L) FOR THE ST. CROIX RIVER STATIONS AT KELLYLAND, WOODLAND AND MILLTOWN

0	1 SAMPLING STATION	2 SDATE	3 STIME	4 T. PHOS MG/L	5 NO2/NO3 MG/L	6 T. NITROGEN MG/L	7 D. O. C. MG/L
1	00NB01AR0013	27-NOV-87	835	0.009	0.03	0.14	6.9
2	00NB01AR0013	15-JAN-88	925		0.07	0.16	6.7
3	00NB01AR0013	26-FEB-88	925		0.04	0.18	6.8
4	00NB01AR0013	26-FEB-88	930		0.05	0.17	6.7
5	00NB01AR0013	26-FEB-88	935		0.05	0.17	6.7
6	00NB01AR0013	13-APR-88	1100	0.005	0.01 L.1		6.6
7	00NB01AR0013	22-JUN-88	1000	0.013 L.01		0.12	6.3
8	00NB01AR0013	14-SEP-88	1010	0.009 L.01		0.17	7.1
9	00NB01AR0013	14-SEP-88	1020	0.010 L.01		0.15	7.0
10	00NB01AR0013	14-SEP-88	1015	0.010 L.01		0.15	6.9
11	00NB01AR0013	17-NOV-88	1025	0.010 L.01		0.10	9.9
12							
13	00NB01AR0014	26-NOV-87	1440		2.40	2.40	96.0
14	00NB01AR0014	15-JAN-88	1000		6.60	7.00	116.0
15	00NB01AR0014	15-JAN-88	1005		6.40	6.50	122.0
16	00NB01AR0014	15-JAN-88	1010		5.90	6.30	114.0
17	00NB01AR0014	26-FEB-88	1000		7.50	11.00	152.0
18	00NB01AR0014	13-APR-88	1135				74.0
19	00NB01AR0014	22-JUN-88	1045			3.40	91.0
20	00NB01AR0014	22-JUN-88	1047			3.30	93.0
21	00NB01AR0014	22-JUN-88	1049			3.10	93.0
22	00NB01AR0014	14-SEP-88	1055		5.30	6.00	59.0
23	00NB01AR0014	17-NOV-88	110		2.40	2.40	63.0
24							
25	00NB01AR0001	27-NOV-87	935	0.023	0.02	0.16	8.9
26	00NB01AR0001	27-NOV-87	937	0.028	0.08	0.18	9.3
27	00NB01AR0001	27-NOV-87	939	0.029	0.04	0.18	9.7
28	00NB01AR0001	15-JAN-88	1100		0.15	0.25	8.5
29	00NB01AR0001	26-FEB-88	1030		0.13	0.21	7.7
30	00NB01AR0001	13-APR-88	1210	0.023	0.03	0.11	7.0
31	00NB01AR0001	13-APR-88	1215	0.017	0.03	0.11	7.3
32	00NB01AR0001	13-APR-88	1220	0.018	0.03	0.16	7.1
33	00NB01AR0001	22-JUN-88	1125	0.046		0.25	9.3
34	00NB01AR0001	14-SEP-88	1125	0.027	0.05	0.20	8.7
35	00NB01AR0001	17-NOV-88	1150	0.018 L.01		0.11	10.0
36	00NB01AR0001	17-NOV-88	1155	0.019 L.01		0.12	9.9
37	00NB01AR0001	17-NOV-88	1201	0.016 L.01		0.12	10.0

TABLE 5: METAL CONCENTRATIONS (MG/L) FOR THE ST. CROIX RIVER
STATIONS AT KELLYLAND, WOODLAND AND MILLTOWN

0	1 SAMPLING STATION	2 SDATE	3 STIME	4 FE-EXT MG/L	5 MN-EXT MG/L	6 CU-EXT MG/L	7 PB-EXT MG/L	8 AL-EXT MG/L	9 HG-EXT MG/L	10 CD-EXT MG/L
1	00NB01AR0013	27-NOV-87	835	0.16	0.02	L.002	L.002	0.065	L.02	L.001
2	00NB01AR0013	15-JAN-88	925	0.12	0.02	L.002	L.002	0.050	L.02	L.001
3	00NB01AR0013	26-FEB-88	925	0.14	0.02	L.002	L.002	0.058	L.02	L.001
4	00NB01AR0013	26-FEB-88	930	0.13	0.02	L.002	L.002	0.059	L.02	L.001
5	00NB01AR0013	26-FEB-88	935	0.13	0.02	L.002	L.002	0.057	L.02	L.001
6	00NB01AR0013	13-APR-88	1100	0.17	0.02	L.002	L.002	0.110	L.02	L.001
7	00NB01AR0013	22-JUN-88	1000	0.13	0.03	L.002	L.002	0.039	L.02	L.001
8	00NB01AR0013	14-SEP-88	1010	0.18	0.02	L.002	L.002	0.053	L.02	L.001
9	00NB01AR0013	14-SEP-88	1020	0.17	0.02	L.002	L.002	0.045	L.02	L.001
10	00NB01AR0013	14-SEP-88	1015	0.18	0.02	L.002	L.002	0.055	L.02	L.001
11	00NB01AR0013	17-NOV-88	1025	0.34	0.02	L.002	L.002	0.100	L.02	L.001
12										
13	00NB01AR0014	26-NOV-87	1440	0.81	2.71	0.003	0.005	3.800	L.02	0.001
14	00NB01AR0014	15-JAN-88	1000	0.88	2.30	IN	IN	6.400	L.02	IN
15	00NB01AR0014	15-JAN-88	1005	0.90	2.30	IN	IN	6.000	L.02	IN
16	00NB01AR0014	15-JAN-88	1010	0.87	2.30	L.002	IN	6.500	L.02	0.001
17	00NB01AR0014	26-FEB-88	1000	0.67	2.00	0.004	0.006	3.000	0.02	0.002
18	00NB01AR0014	13-APR-88	1135	0.87	2.60	0.005	0.007	3.400	0.02	0.001
19	00NB01AR0014	22-JUN-88	1045	0.76	2.94	0.008	0.011	3.600	L.02	0.002
20	00NB01AR0014	22-JUN-88	1047	0.79	2.94	0.008	0.010	3.600	L.02	0.002
21	00NB01AR0014	22-JUN-88	1049	0.74	2.94	0.008	0.010	3.600	L.02	0.002
22	00NB01AR0014	14-SEP-88	1055	0.66	2.00	0.006	0.008	3.300	0.02	0.003
23	00NB01AR0014	17-NOV-88	1110	0.80	2.20	0.004		3.300	L.02	0.001
24										
25	00NB01AR0001	27-NOV-87	935	0.23	0.08	L.002	L.002	0.170	L.02	L.001
26	00NB01AR0001	27-NOV-87	937	0.23	0.08	L.002	L.002	0.160	L.02	L.001
27	00NB01AR0001	27-NOV-87	939	0.23	0.08	L.002	L.002	0.160	L.02	L.001
28	00NB01AR0001	15-JAN-88	1100	0.23	0.23	0.002	L.002	0.140	L.02	L.001
29	00NB01AR0001	26-FEB-88	1030	0.18	0.18	L.002	L.002	0.100	L.02	L.001
30	00NB01AR0001	13-APR-88	1210	0.18	0.04	0.002	L.002	0.120	L.02	L.001
31	00NB01AR0001	13-APR-88	1215	0.22	0.03	0.002	L.002	0.110	L.02	L.001
32	00NB01AR0001	13-APR-88	1220	0.18	0.04	L.002	0.003	0.130	L.02	L.001
33	00NB01AR0001	22-JUN-88	1125	0.25	0.15	L.002	L.002	0.140	L.02	L.001
34	00NB01AR0001	14-SEP-88	1125	0.30	0.06	L.002	L.002	0.100	L.02	L.001
35	00NB01AR0001	17-NOV-88	1150	0.26	0.04	L.002	L.002	0.150	L.02	L.001
36	00NB01AR0001	17-NOV-88	1155	0.25	0.04	L.002	L.002	0.140	L.02	L.001
37	00NB01AR0001	17-NOV-88	1201	0.25	0.04	L.002	L.002	0.150	L.02	L.001

TABLE 6: MAJOR ION EQUIVALENT CONCENTRATIONS (MEQ/L)
FOR THE ST. CROIX RIVER STATIONS AT
KELLYLAND, WOODLAND AND MILLTOWN

0	1 STATION	2 SAMPLING DATE	3 SAMPLING TIME	4 CA MEQ/L	5 MG MEQ/L	6 NA MEQ/L	7 K MEQ/L	8 CL MEQ/L	9 SO4 MEQ/L	10 HCO3 MEQ/L
1	00NB01AR0013	27-NOV-87	1440	0.20958	0.071566	0.07395	0.008438	0.053599	0.077034	0.137862
2	00NB01AR0013	15-JAN-88	925	0.16966	0.054292	0.06960	0.008950	0.084630	0.074952	0.135864
3	00NB01AR0013	26-FEB-88	925	0.19461	0.064985	0.07395	0.008694	0.062062	0.081198	0.137862
4	00NB01AR0013	26-FEB-88	930	0.19461	0.064985	0.07395	0.008694	0.062062	0.081198	0.137862
5	00NB01AR0013	26-FEB-88	935	0.19461	0.064985	0.06960	0.008950	0.062062	0.081198	0.139860
6	00NB01AR0013	13-APR-88	1100	0.12475	0.047711	0.06090	0.007927	0.050778	0.066624	0.083916
7	00NB01AR0013	22-JUN-88	1000	0.17465	0.051001	0.07395	0.008694	0.042315	0.060378	0.131868
8	00NB01AR0013	14-SEP-88	1010	0.16966	0.059227	0.06960	0.008694	0.047957	0.064542	0.147852
9	00NB01AR0013	14-SEP-88	1020	0.16966	0.059227	0.06960	0.008694	0.045136	0.062460	0.143856
10	00NB01AR0013	14-SEP-88	1015	0.16966	0.059227	0.06525	0.011251	0.050778	0.064542	0.149850
11	00NB01AR0013	17-NOV-88	1025	0.17465	0.066631	0.07830	0.009461	0.062062	0.074952	0.139860
12										
13	00NB01AR0014	26-NOV-87	835	4.29140	0.510012	21.75000	0.582996	20.875400	4.996800	4.599396
14	00NB01AR0014	15-JAN-88	1000	3.59280	0.403074	21.27150	0.529299	12.976600		
15	00NB01AR0014	15-JAN-88	1005	3.59280	0.394848	20.31450	0.519071	12.694500	6.246000	5.032962
16	00NB01AR0014	15-JAN-88	1010	3.54290	0.386622	20.31450	0.053697	12.130300	6.037800	
17	00NB01AR0014	26-FEB-88	1000	3.04390	0.411300	22.62000	0.588110	11.566100	6.037800	
18	00NB01AR0014	13-APR-88	1135	3.29340	0.394848	17.35650	0.434690	11.566100	4.996800	3.926070
19	00NB01AR0014	22-JUN-88	1045	3.59280	0.460656			16.192540	4.746960	
20	00NB01AR0014	22-JUN-88	1047	3.59280	0.452430			15.882230	4.892700	
21	00NB01AR0014	22-JUN-88	1049	3.49300	0.460656			15.374450	4.705320	
22	00NB01AR0014	14-SEP-88	1055	2.59480	0.370170	20.31450	0.741530	16.079700	6.141900	4.881114
23	00NB01AR0014	17-NOV-88	1110	3.64270	0.435978	17.40000	0.485830	12.976600	4.434660	4.925070
24										
25	00NB01AR0001	27-NOV-87	935	0.30938	0.076502	0.66120	0.024547	0.504959	0.214446	0.265734
26	00NB01AR0001	27-NOV-87	937	0.30439	0.077324	0.66120	0.024547	0.507780	0.214446	0.261738
27	00NB01AR0001	27-NOV-87	939	0.30439	0.077324	0.66120	0.024803	0.502138	0.222774	0.261738
28	00NB01AR0001	15-JAN-88	1100	0.22954	0.062518	0.41760	0.018410	0.290563	0.181134	0.215784
29	00NB01AR0001	26-FEB-88	1030	0.21956	0.069098	0.27840	0.014064	0.174902	0.139494	0.201798
30	00NB01AR0001	13-APR-88	1210	0.16467	0.052646	0.23925	0.012274	0.174902	0.116592	0.133866
31	00NB01AR0001	13-APR-88	1215	0.16467	0.052646	0.23925	0.012274	0.174902	0.116592	0.133866
32	00NB01AR0001	13-APR-88	1220	0.16467	0.052646	0.23925	0.012274	0.174902	0.116592	0.131868
33	00NB01AR0001	22-JUN-88	1125	0.31936	0.071566			0.631904	0.254004	0.371628
34	00NB01AR0001	14-SEP-88	1125	0.22455	0.068276	0.29580	0.017643	0.177723	0.127002	0.221778
35	00NB01AR0001	17-NOV-88	1150	0.22954	0.071566	0.25665	0.015086	0.191828	0.122838	0.201798
36	00NB01AR0001	17-NOV-88	1155	0.22455	0.070744	0.25230	0.014831	0.174902	0.122838	0.205794
37	00NB01AR0001	17-NOV-88	1201	0.21956	0.073211	0.25665	0.015342	0.177723	0.122838	0.203796

TABLE 7: QUALITY CONTROL SAMPLE BLANKS
FOR METALS AND TOTAL PHOSPHORUS

0	1 SAMPLING STATION	2 SDATE	3 STIME	4 MN-EXT MG/L	5 CU-EXT MG/L	6 PB-EXT MG/L	7 AL-EXT MG/L	8 HG-EXT UG/L	9 CD-EXT MG/L	10 T. PHOS MG/L
1	00NB01AR9901	15-JAN-88	1201					L.02		L.001
2	00NB01AR9901	13-APR-88	1300	L.01	L.002	L.002	L.010	L.02	L.001	L.001
3	00NB01AR9901	22-JUN-88	1201	L.01	L.002	L.002	L.010	L.02	L.001	L.001
4	00NB01AR9901	14-SEP-88	1201	L.01	L.002	L.002	L.010	L.02	L.001	L.001

FIGURE 1

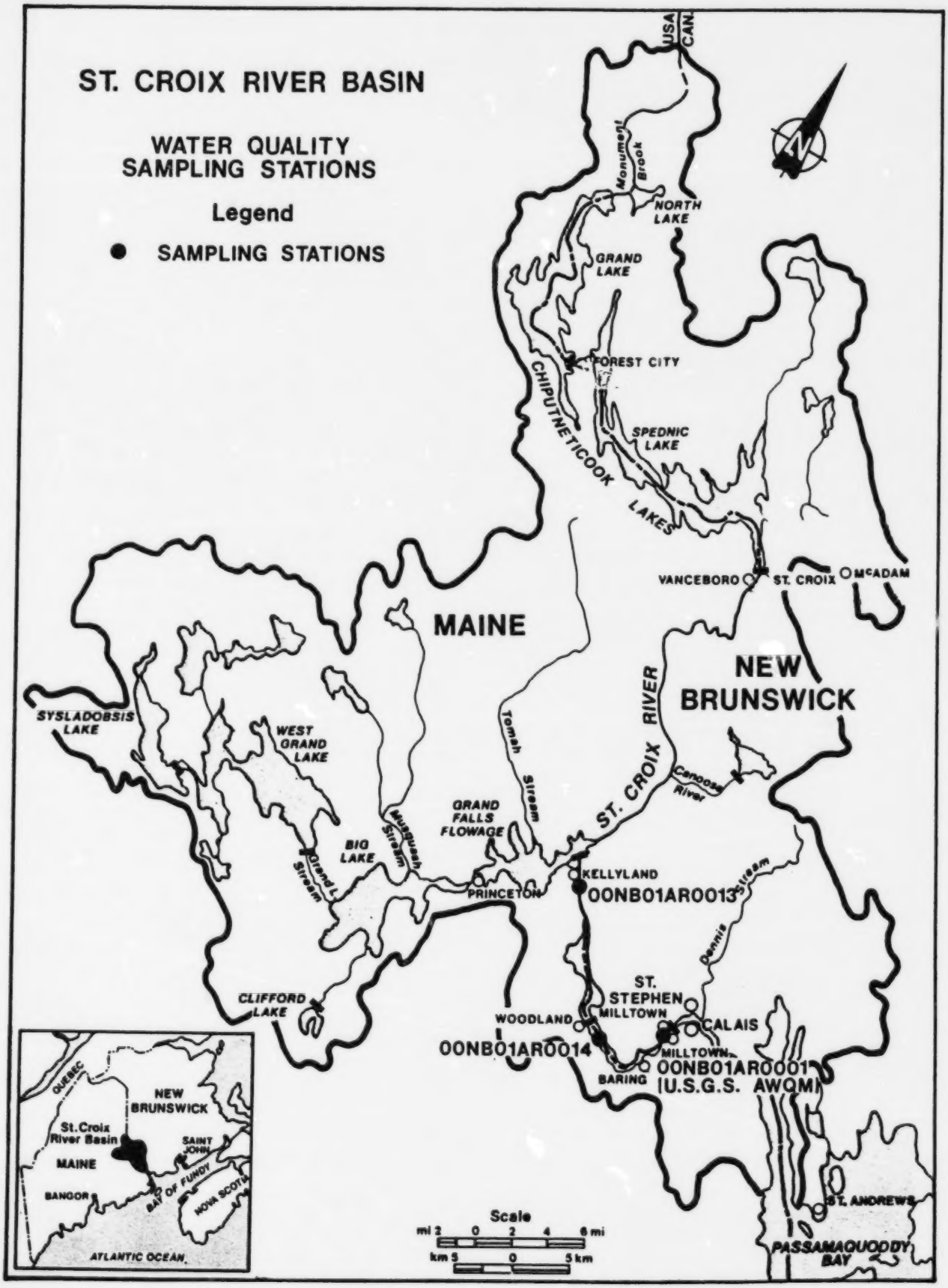

ST. CROIX RIVER BASIN
WATER QUALITY SAMPLING STATIONS
Legend
SAMPLING STATIONS
USA
CAN
Monument Brook
NORTH LAKE
GRAND LAKE
FOREST CITY
CHIPUTNETICOOK LAKES
SPEDNIC LAKE
VANCEBORO
ST. CROIX
McADAM
MAINE
NEW BRUNSWICK
ST. CROIX RIVER
SYSLADOBSIS LAKE
WEST GRAND LAKE
Tomah Stream
Canoose River
GRAND FALLS FLOWAGE
Musquash Stream
BIG LAKE
Grand L. Stream
PRINCETON
KELLYLAND
00NB01AR0013
Dennis Stream
CLIFFORD LAKE
ST. STEPHEN
MILLTOWN
WOODLAND
CALAIS
00NB01AR0014
MILLTOWN
BARING
00NB01AR0001
U.S.G.S. AWQMI
ST. ANDREWS
PASSAMAQUODDY BAY
Scale
mi 2 0 2 4 6 mi
km 5 0 5 km
QUEBEC
NEW BRUNSWICK
St. Croix River Basin
SAINT JOHN
MAINE
BANGOR
BAY OF FUNDY
NOVA SCOTIA
ATLANTIC OCEAN

FIGURE 2
DISSOLVED OXYGEN (MG/L) AT ST. CROIX RIVER
SAMPLING STATIONS - WQB GRAB SAMPLES
NOV.1987 TO NOV.1988

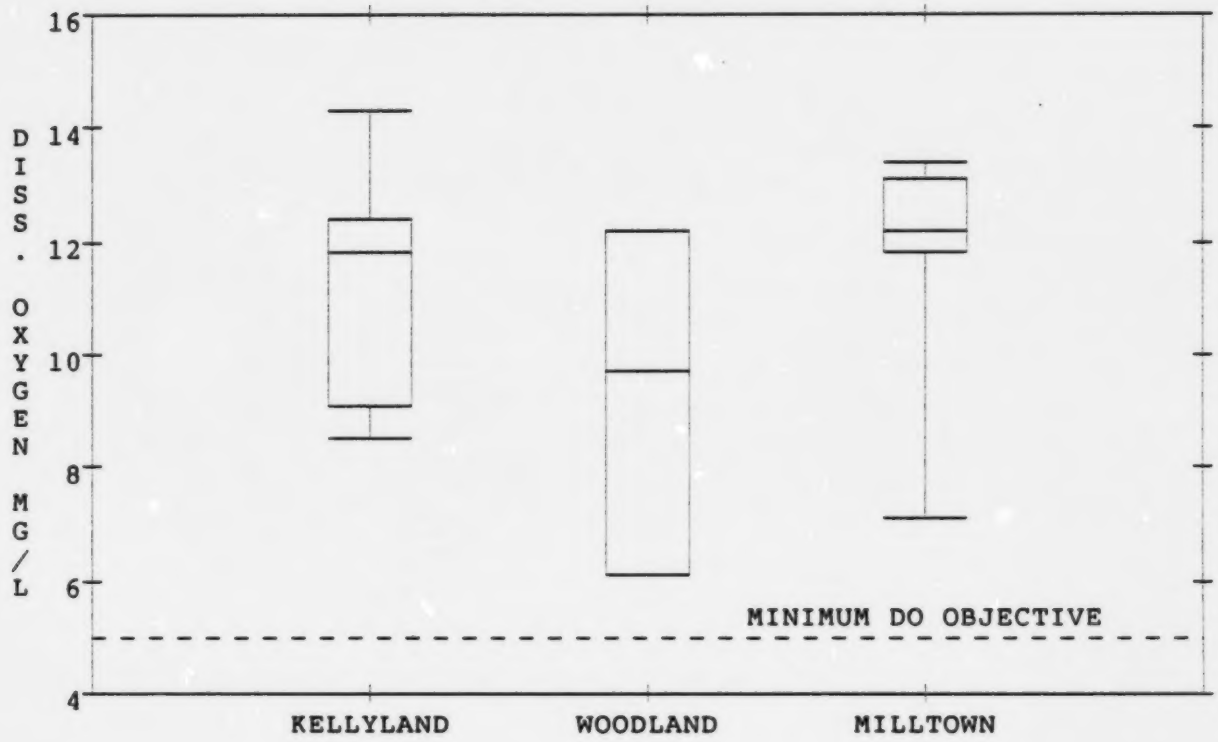


FIGURE 3
DISSOLVED OXYGEN (% SATURATION) AT ST. CROIX RIVER
SAMPLING STATIONS - WQB GRAB SAMPLES
NOV.1987 TO NOV.1988

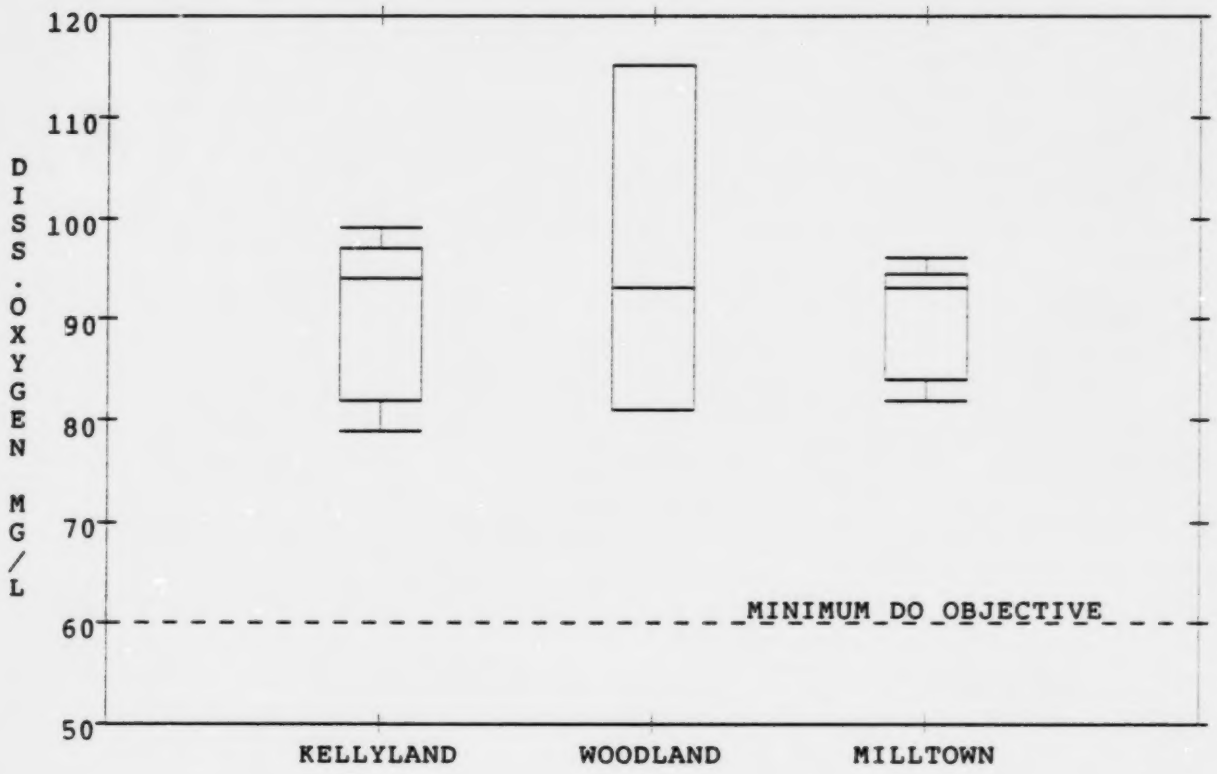


FIGURE 4
PH AT ST. CROIX RIVER SAMPLING STATIONS
WQB GRAB SAMPLES - NOV.1987 TO NOV.1988

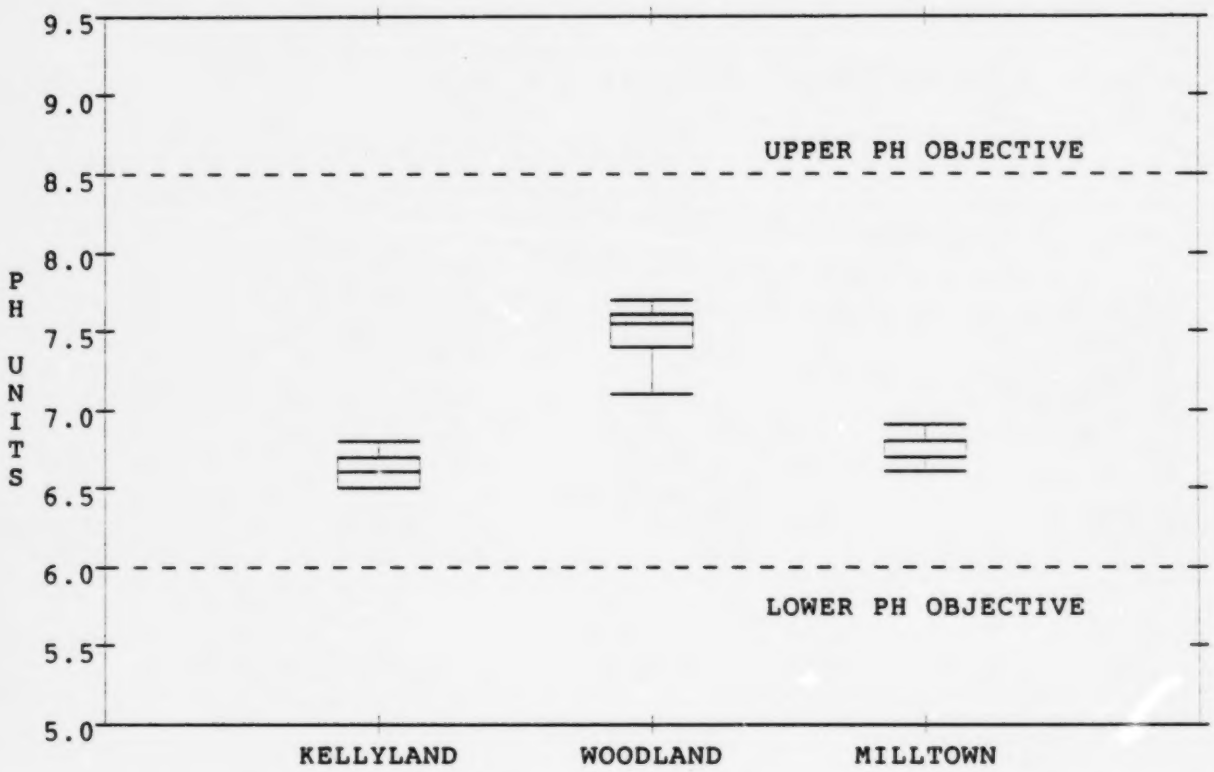


FIGURE 5
ST. CROIX RIVER AT MILLTOWN AWQM DATA
MEAN DISSOLVED OXYGEN (MG/L) FOR JULY,
AUGUST AND SEPTEMBER,1988

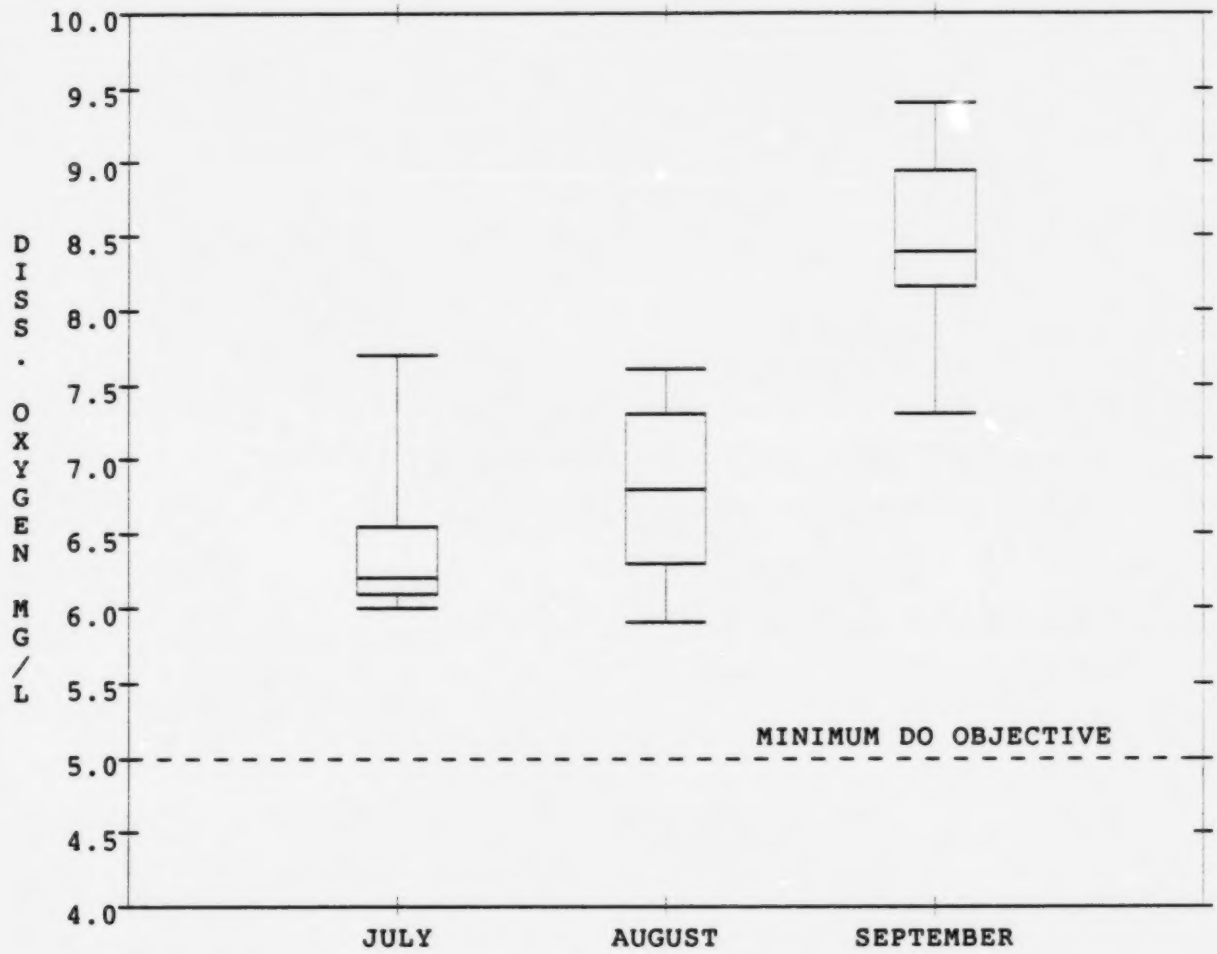


FIGURE 6
ST. CROIX RIVER AT MILLTOWN AWQM DATA
(JULY 3 TO SEPTEMBER 30,1988)
MEAN DISSOLVED OXYGEN(MG/L) AND MEAN DISCHARGE(CMS)

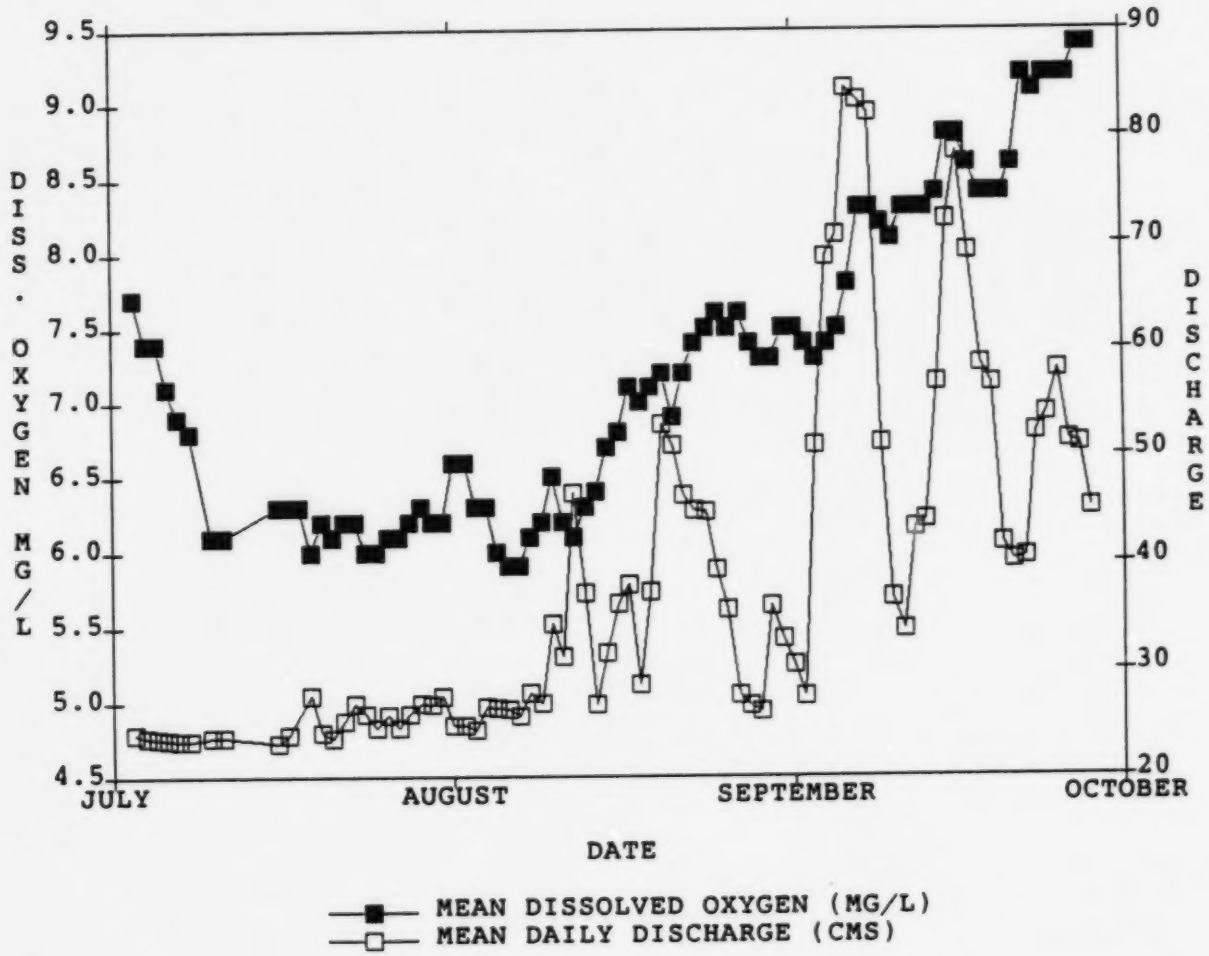


FIGURE 7
ST. CROIX RIVER AT MILLTOWN AWQM DATA
(JULY 3 TO SEPTEMBER 30,1988)
MEAN DISSOLVED OXYGEN (% SATURATION) AND MEAN DISCHARGE(CMS)

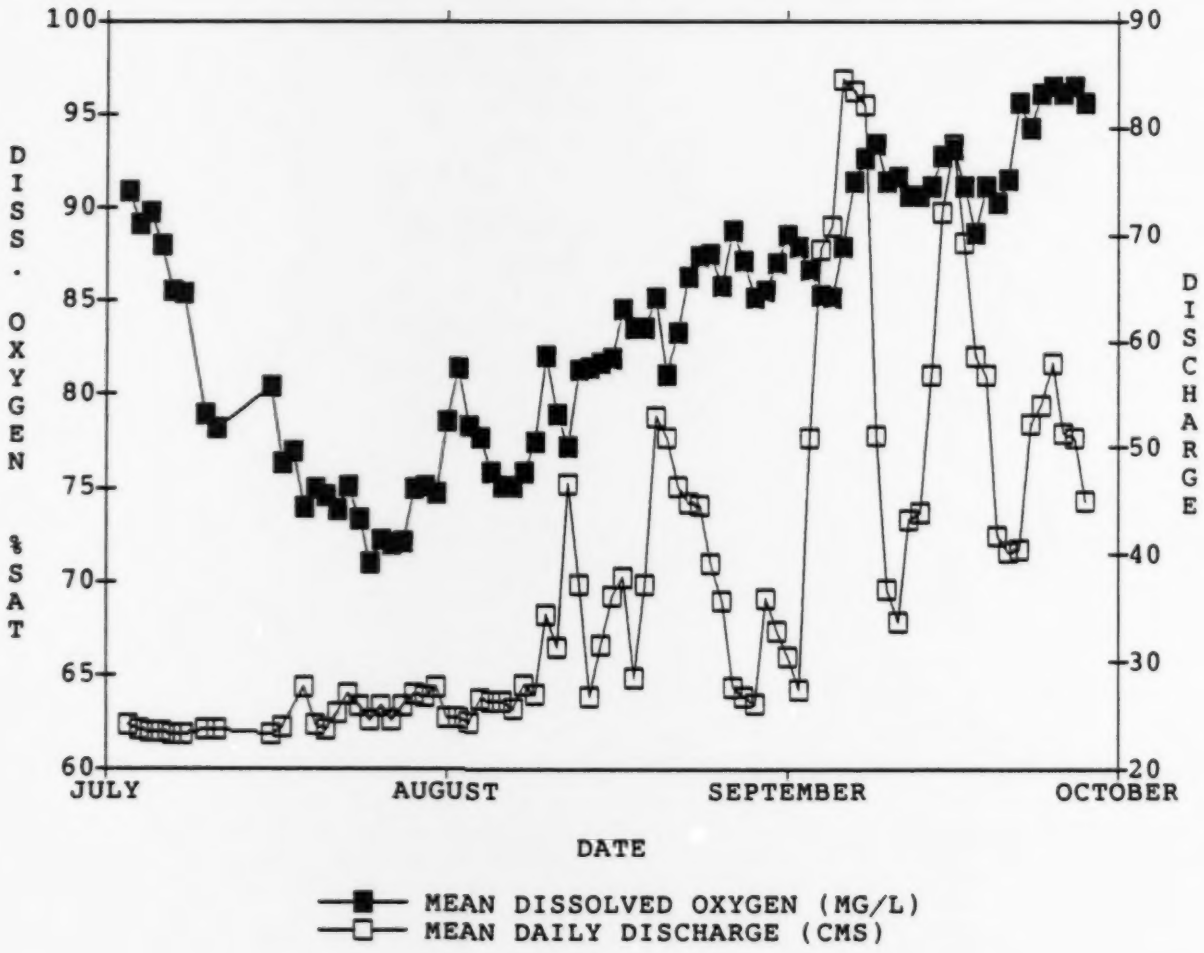
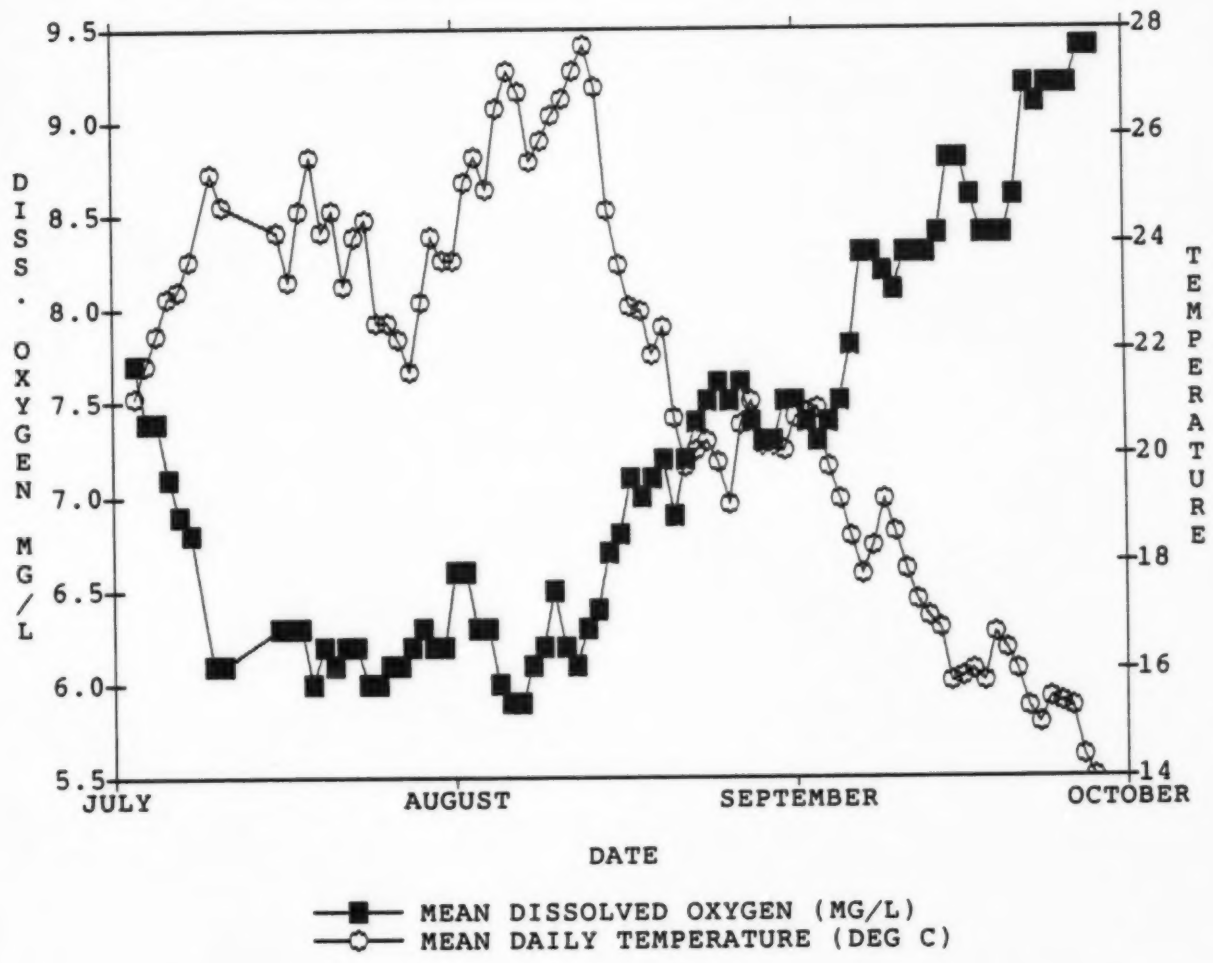


FIGURE 8
ST. CROIX RIVER AT MILLTOWN AWQM DATA
(JULY 3 TO SEPTEMBER 30,1988)
MEAN DISSOLVED OXYGEN (MG\L) AND MEAN TEMPERATURE (DEG C)



SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-JAN-88 to 31-JAN-88

DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
# 1-JAN-88	0.0	0.0	0.0	15	6.3	6.3	6.4	15	93.7	93.7	93.7	15
2-JAN-88	0.0	0.0	0.0	24	6.3	6.4	6.4	24	89.8	92.9	93.7	24
3-JAN-88	0.0	0.0	0.0	24	6.3	6.4	6.5	24	89.8	94.4	97.6	24
4-JAN-88	0.0	0.0	0.0	24	6.3	6.4	6.4	24	89.8	93.1	97.6	24
5-JAN-88	0.0	0.0	0.0	21	6.4	6.4	6.5	21	97.6	99.7	101.6	21
6-JAN-88	0.0	0.0	0.0	24	6.3	6.4	6.4	24	97.6	99.6	101.6	24
7-JAN-88	0.0	0.0	0.0	24	6.2	6.3	6.4	24	89.8	93.4	97.6	24
8-JAN-88	0.0	0.0	0.0	21	6.2	6.3	6.4	21	89.8	90.6	93.7	21
9-JAN-88	0.0	0.0	0.0	24	6.2	6.3	6.3	24	85.9	91.5	97.6	24
10-JAN-88	0.0	0.0	0.0	21	6.3	6.3	6.3	21	97.6	97.6	97.6	21
11-JAN-88	0.0	0.0	0.0	24	6.2	6.3	6.3	24	93.7	96.3	97.6	24
12-JAN-88	0.0	0.0	0.0	24	6.2	6.3	6.3	24	93.7	95.8	97.6	24
13-JAN-88	0.0	0.0	0.0	24	6.3	6.4	6.4	24	93.7	96.8	101.6	24
14-JAN-88	0.0	0.0	0.0	9	6.3	6.4	6.4	9	82.0	89.0	97.6	9
18-JAN-88	0.0	0.0	0.0	18	6.3	6.4	6.4	18	93.7	97.6	101.6	18
19-JAN-88	0.0	0.0	0.0	9	6.4	6.4	6.4	9	97.6	99.4	101.6	9
20-JAN-88	0.0	0.0	0.0	15	6.3	6.4	6.4	15	89.8	93.0	97.6	15
21-JAN-88	0.0	0.0	0.0	24	6.3	6.4	6.4	24	85.9	88.4	93.7	24
22-JAN-88	0.0	0.2	0.4	24	6.3	6.4	6.5	24	85.9	91.6	93.7	24
23-JAN-88	0.0	0.2	0.4	24	6.5	6.5	6.5	24	89.8	94.2	97.6	24
24-JAN-88	0.0	0.3	0.4	24	6.5	6.5	6.5	24	89.8	92.9	97.6	24
25-JAN-88	0.0	0.4	0.4	21	6.5	6.5	6.5	21	85.9	89.5	93.7	21
26-JAN-88	0.0	0.4	0.4	24	6.5	6.5	6.5	24	89.8	92.3	97.6	24
27-JAN-88	0.0	0.4	0.4	24	6.4	6.5	6.5	24	89.8	91.5	93.7	24
28-JAN-88	0.0	0.2	0.4	24	6.4	6.4	6.5	24	89.8	90.6	93.7	24
29-JAN-88	0.0	0.0	0.0	9	6.4	6.4	6.4	9	89.8	89.8	89.8	9
30-JAN-88	0.0	0.0	0.4	12	6.4	6.5	6.5	12	89.8	94.4	97.6	12
31-JAN-88	0.4	0.4	0.4	18	6.5	6.5	6.5	18	89.8	92.6	101.6	18
GRAND MONTHLY MEAN	0.0	0.1	0.1		6.3	6.4	6.4		90.8	93.7	97.1	

\# A day with less than 24 values.

**** No data values for that day.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-JAN-88 to 31-JAN-88

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
# 1-JAN-88	10.7	11.0	11.2	15	76.1	78.0	79.4	15	******	******	******	********
2-JAN-88	11.1	11.2	11.3	24	78.9	79.2	80.0	24	******	******	******	********
3-JAN-88	11.0	11.1	11.3	24	77.7	78.5	80.0	24	******	******	******	********
4-JAN-88	10.9	11.0	11.0	24	77.3	77.7	78.3	24	******	******	******	********
5-JAN-88	10.8	11.0	11.1	21	76.7	77.8	78.9	21	******	******	******	********
6-JAN-88	10.5	10.7	10.9	24	74.5	75.7	77.3	24	******	******	******	********
7-JAN-88	9.9	10.2	10.4	24	70.1	72.7	73.9	24	******	******	******	********
8-JAN-88	10.0	10.1	10.3	21	70.6	71.7	73.4	21	******	******	******	********
9-JAN-88	10.1	10.3	10.5	24	71.7	73.0	74.5	24	******	******	******	********
10-JAN-88	10.0	10.1	10.4	21	70.6	71.8	73.9	21	******	******	******	********
11-JAN-88	9.4	9.9	10.1	24	66.2	69.7	71.7	24	******	******	******	********
12-JAN-88	9.9	10.1	10.3	24	70.1	71.2	72.8	24	******	******	******	********
13-JAN-88	10.3	10.7	11.1	24	72.8	75.6	78.9	24	******	******	******	********
14-JAN-88	10.6	10.9	11.1	9	75.0	77.1	78.9	9	******	******	******	********
18-JAN-88	10.8	10.8	10.9	18	76.7	76.7	77.3	18	******	******	******	********
19-JAN-88	10.8	10.9	11.0	9	76.7	77.0	77.7	9	******	******	******	********
20-JAN-88	10.7	10.7	10.8	15	76.1	76.3	76.7	15	******	******	******	********
21-JAN-88	10.6	10.7	10.7	24	75.0	75.7	76.1	24	******	******	******	********
22-JAN-88	10.5	11.2	11.6	24	74.5	79.9	83.1	24	******	******	******	********
23-JAN-88	11.3	11.4	11.6	24	80.0	81.6	83.1	24	******	******	******	********
24-JAN-88	11.2	11.3	11.5	24	79.4	81.2	82.5	24	******	******	******	********
25-JAN-88	11.4	11.4	11.5	21	81.4	81.8	82.5	21	******	******	******	********
26-JAN-88	11.0	11.2	11.5	24	79.2	80.6	82.5	24	******	******	******	********
27-JAN-88	10.9	11.0	11.0	24	78.1	78.6	79.2	24	******	******	******	********
28-JAN-88	10.8	10.9	11.0	24	76.7	77.6	78.6	24	******	******	******	********
28-FEB-88	10.7	10.8	10.8	9	76.1	76.4	76.7	9	******	******	******	********
30-JAN-88	10.7	10.8	10.9	12	76.1	76.7	77.5	12	******	******	******	********
31-JAN-88	10.9	11.0	11.0	18	78.1	78.6	79.2	18	******	******	******	********
GRAND MONTHLY MEAN	10.6	10.8	11.0		75.4	76.7	78.0		******	******	******	********

\# A day with less than 24 values.

**** No data values for that day.

@ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-FEB-88 to 29-FEB-88

DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-FEB-88	0.4	0.4	0.4	24	6.5	6.5	6.5	24	89.8	92.4	101.6	24
2-FEB-88	0.4	0.4	0.4	17	6.5	6.7	9.8	17	89.8	92.4	93.7	17
3-FEB-88	0.0	0.1	0.4	18	6.6	6.7	6.8	18	89.8	94.8	97.6	18
4-FEB-88	0.0	0.0	0.0	24	6.7	6.7	6.7	24	89.8	91.8	97.6	24
5-FEB-88	0.0	0.0	0.0	24	6.7	6.7	6.7	24	89.8	91.1	93.7	24
6-FEB-88	0.0	0.0	0.0	24	6.6	6.7	6.7	24	89.8	91.5	93.7	24
7-FEB-88	0.0	0.0	0.0	24	6.6	6.6	6.7	24	85.9	89.8	93.7	24
8-FEB-88	0.0	0.0	0.0	24	6.6	6.7	6.7	24	85.9	89.5	89.8	24
9-FEB-88	0.0	0.0	0.0	24	6.7	6.7	6.7	24	89.8	90.3	93.7	24
10-FEB-88	0.0	0.0	0.0	24	6.7	6.7	6.7	24	85.9	88.2	89.8	24
11-FEB-88	0.0	0.0	0.0	24	6.7	6.7	6.7	24	85.9	91.8	97.6	24
12-FEB-88	0.0	0.0	0.0	24	6.7	6.7	6.7	24	85.9	88.5	93.7	24
13-FEB-88	0.0	0.0	0.0	24	6.7	6.7	6.7	24	85.9	91.0	97.6	24
14-FEB-88	0.0	0.0	0.0	24	6.7	6.7	6.7	24	93.7	99.1	101.6	24
15-FEB-88	0.0	0.0	0.0	24	6.7	6.7	6.7	24	89.8	95.4	113.3	24
16-FEB-88	0.0	0.4	0.4	21	6.7	6.7	6.8	21	85.9	90.6	93.7	21
17-FEB-88	0.0	0.2	0.4	24	6.7	6.7	6.7	24	85.9	89.7	89.8	24
18-FEB-88	0.0	0.4	0.4	24	6.7	6.7	6.7	24	85.9	88.2	89.8	24
19-FEB-88	0.0	0.4	0.4	21	6.7	6.7	6.7	21	82.0	86.5	89.8	21
20-FEB-88	0.0	0.4	0.4	24	6.7	6.7	6.7	24	82.0	85.9	89.8	24
21-FEB-88	0.0	0.4	0.4	24	6.5	6.6	6.7	24	78.1	81.4	85.9	24
22-FEB-88	0.0	0.1	0.4	24	6.5	6.5	6.5	24	82.0	83.2	85.9	24
23-FEB-88	0.0	0.4	0.4	24	6.5	6.5	6.6	24	78.1	81.0	82.0	24
24-FEB-88	0.0	0.5	0.8	24	6.5	6.5	6.5	24	78.1	78.1	78.1	24
25-FEB-88	0.0	0.4	0.8	24	6.5	6.5	6.5	24	78.1	79.4	82.0	24
26-FEB-88	0.0	0.5	0.8	24	6.5	6.5	6.5	24	70.3	73.2	78.1	24
27-FEB-88	0.0	0.4	0.8	24	6.5	6.6	6.6	24	70.3	73.9	78.1	24
28-FEB-88	0.0	0.4	0.8	24	6.6	6.6	6.7	24	70.3	74.5	78.1	24
29-FEB-88	0.4	0.5	0.8	21	6.6	6.6	6.6	21	70.3	74.0	78.1	21
GRAND MONTHLY MEAN												
	0.0	0.2	0.3		6.6	6.6	6.8		83.6	86.8	90.6	

\# A day with less than 24 values.

**** No data values for that day.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-FEB-88 to 29-FEB-88

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-FEB-88	10.9	11.0	11.0	24	78.1	78.6	79.2	24	******	******	******	********
2-FEB-88	10.7	11.0	11.9	17	77.0	78.8	85.3	17	******	******	******	********
3-FEB-88	11.6	11.9	12.4	18	82.2	84.7	88.7	18	******	******	******	********
4-FEB-88	12.1	12.3	12.4	24	86.1	87.0	87.7	24	******	******	******	********
5-FEB-88	12.0	12.1	12.3	24	85.0	85.9	87.1	24	******	******	******	********
6-FEB-88	11.8	11.9	12.1	24	83.8	84.6	86.1	24	******	******	******	********
7-FEB-88	11.6	11.8	12.0	24	82.2	83.7	85.0	24	******	******	******	********
8-FEB-88	11.7	11.9	12.1	24	83.3	84.5	85.5	24	******	******	******	********
9-FEB-88	11.9	12.1	12.2	24	84.4	85.6	86.6	24	******	******	******	********
10-FEB-88	12.1	12.2	12.3	24	85.5	86.2	87.1	24	******	******	******	********
11-FEB-88	12.0	12.1	12.3	24	85.0	86.1	87.1	24	******	******	******	********
12-FEB-88	12.1	12.2	12.3	24	85.5	86.3	87.1	24	******	******	******	********
13-FEB-88	11.7	12.0	12.2	24	82.8	84.8	86.6	24	******	******	******	********
14-FEB-88	11.7	11.7	12.0	24	82.8	83.3	85.0	24	******	******	******	********
15-FEB-88	11.9	12.0	12.1	24	84.4	84.8	85.5	24	******	******	******	********
16-FEB-88	11.9	12.1	12.1	21	85.3	86.2	87.0	21	******	******	******	********
17-FEB-88	11.9	12.0	12.1	24	84.4	85.4	86.4	24	******	******	******	********
18-FEB-88	11.8	11.9	12.0	24	84.4	85.5	85.9	24	******	******	******	********
19-FEB-88	11.7	11.8	11.9	21	83.7	84.4	85.3	21	******	******	******	********
20-FEB-88	11.7	11.7	11.9	24	83.7	84.3	85.3	24	******	******	******	********
21-FEB-88	10.8	11.4	11.7	24	77.5	81.8	84.2	24	******	******	******	********
22-FEB-88	10.3	10.4	10.7	24	72.8	74.1	77.0	24	******	******	******	********
23-FEB-88	10.4	10.6	10.7	24	74.5	75.6	76.4	24	******	******	******	********
24-FEB-88	10.5	10.6	10.7	24	75.3	76.2	77.8	24	******	******	******	********
25-FEB-88	10.6	10.7	10.9	24	75.0	76.8	78.1	24	******	******	******	********
26-FEB-88	10.9	11.0	11.1	24	78.6	79.1	80.6	24	******	******	******	********
27-FEB-88	10.9	11.0	11.1	24	77.3	78.9	80.6	24	******	******	******	********
28-FEB-88	10.8	11.0	11.2	24	76.7	78.8	81.2	24	******	******	******	********
29-FEB-88	10.9	11.2	11.4	21	78.1	80.3	82.3	21	******	******	******	********
GRAND MONTHLY MEAN	11.4	11.6	11.8		81.2	82.5	84.1		0.0	0.0	0.0	

\# A day with less than 24 values.

**** No data values for that day.

@ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-MAR-88 to 31-MAR-88

28-Mar-89 ENVIRONMENT CANADA WATER QUALITY BRANCH - MONCTON

DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-MAR-88	0.4	0.6	0.8	24	6.5	6.6	6.6	24	70.3	71.1	74.2	24
2-MAR-88	0.4	0.6	1.2	24	6.6	6.6	6.6	24	70.3	73.4	78.1	24
3-MAR-88	0.8	1.2	1.6	18	6.6	6.6	6.6	18	66.4	69.0	70.3	18
4-MAR-88	0.4	0.7	1.6	24	6.6	6.6	6.6	24	66.4	69.2	70.3	24
5-MAR-88	0.4	0.7	0.8	9	6.6	6.7	6.7	9	66.4	69.4	70.3	9
6-MAR-88	0.0	0.4	0.8	15	6.6	6.6	6.6	15	66.4	70.0	70.3	15
7-MAR-88	0.0	1.0	2.0	24	6.6	6.6	6.6	24	66.4	69.2	70.3	24
8-MAR-88	0.0	1.1	2.0	24	6.6	6.6	6.7	24	66.4	68.8	74.2	24
9-MAR-88	0.0	0.8	1.6	24	6.5	6.6	6.6	24	62.5	64.6	66.4	24
10-MAR-88	0.0	1.4	1.6	21	6.6	6.6	6.7	21	62.5	65.1	66.4	21
11-MAR-88	0.0	0.7	1.6	24	6.6	6.6	6.7	24	66.4	68.2	70.3	24
12-MAR-88	0.0	2.9	10.6	7	4.0	6.3	6.7	9	54.7	69.7	74.2	9
13-MAR-88	0.0	0.4	0.4	18	6.5	6.6	6.7	18	70.3	75.3	82.0	18
14-MAR-88	0.0	0.1	1.2	24	6.6	6.7	6.7	24	-46.9	75.0	85.9	24
15-MAR-88	0.0	1.0	1.6	21	6.6	6.7	6.7	21	70.3	76.8	85.9	21
16-MAR-88	0.0	5.4	23.0	22	6.4	6.6	6.7	24	27.3	69.9	78.1	24
17-MAR-88	0.0	26.0	29.7	0	4.0	4.9	6.4	24	******	******	******	*******
18-MAR-88	0.0	29.8	31.2	10	4.0	4.0	4.0	24	11.7	15.2	15.6	24
19-MAR-88	0.0	31.2	32.8	24	4.0	4.0	4.0	24	15.6	15.6	15.6	24
20-MAR-88	0.0	28.3	32.8	24	4.0	4.0	4.0	24	15.6	15.6	15.6	24
21-MAR-88	0.0	19.8	26.6	24	4.0	4.7	6.4	24	15.6	30.8	97.6	24
22-MAR-88	0.0	17.1	21.5	24	4.0	4.9	6.6	24	3.9	15.3	46.9	24
23-MAR-88	0.0	24.6	28.1	24	4.0	4.0	4.0	24	15.6	15.6	15.6	24
24-MAR-88	0.0	29.7	33.6	24	4.0	4.0	4.0	24	15.6	15.6	15.6	24
25-MAR-88	0.0	33.4	34.0	21	4.0	4.0	4.0	21	15.6	15.6	15.6	21
26-MAR-88	0.0	33.7	35.5	24	4.0	4.0	4.0	24	15.6	15.6	15.6	24
27-MAR-88	0.0	34.0	35.5	24	4.0	4.0	4.0	24	15.6	15.6	15.6	24
28-MAR-88	0.0	33.4	33.6	24	4.0	4.0	4.0	24	15.6	15.6	15.6	24
29-MAR-88	0.0	28.7	32.8	19	4.0	4.0	4.0	21	3.9	15.9	15.6	21
30-MAR-88	0.0	30.9	34.4	18	4.0	4.0	4.0	18	15.6	15.6	15.6	18
31-MAR-88	1.6	13.1	34.8	21	4.0	5.5	6.7	24	3.9	32.9	43.0	24
GRAND MONTHLY MEAN	0.1	14.0	17.1		5.2	5.5	5.7	.	36.2	45.8	51.5	

\# A day with less than 24 values.

**** No data values for that day.

intake restricted by sawdust.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-MAR-88 to 31-MAR-88

28-Mar-89 ENVIRONMENT CANADA WATER QUALITY BRANCH - MONCTON

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-MAR-88	11.1	11.3	11.4	24	79.7	81.1	82.8	24	******	******	******	********
2-MAR-88	11.0	11.3	11.4	24	79.2	81.7	83.7	24	******	******	******	********
3-MAR-88	11.2	11.4	11.7	18	81.8	83.8	86.4	18	******	******	******	********
4-MAR-88	11.2	11.3	11.4	24	80.3	81.9	84.6	24	******	******	******	********
5-MAR-88	11.1	11.3	11.4	9	79.7	81.6	82.3	9	******	******	******	********
6-MAR-88	10.9	11.1	11.3	15	77.3	79.6	81.8	15	******	******	******	********
7-MAR-88	11.3	11.4	11.5	24	80.9	83.0	86.1	24	******	******	******	********
8-MAR-88	11.3	11.4	11.6	24	81.4	83.3	86.7	24	******	******	******	********
9-MAR-88	10.9	11.1	11.3	24	78.1	80.8	83.5	24	******	******	******	********
10-MAR-88	11.3	11.4	11.5	21	82.6	83.8	85.2	21	******	******	******	********
11-MAR-88	10.2	11.0	11.5	24	73.8	79.4	85.2	24	******	******	******	********
12-MAR-88	5.4	8.4	9.8	9	50.3	63.2	69.7	9	******	******	******	********
13-MAR-88	10.4	10.6	10.7	18	74.7	75.7	76.4	18	******	******	******	********
14-MAR-88	10.5	10.7	10.9	24	56.3	76.0	78.9	24	******	******	******	********
15-MAR-88	10.1	10.4	10.7	21	73.6	76.1	78.0	21	******	******	******	********
16-MAR-88	3.2	8.4	10.5	24	33.6	66.1	77.8	24	******	******	******	********
17-MAR-88	5.2	6.1	8.4	24	71.3	80.3	104.3	24	******	******	******	********
18-MAR-88	5.1	5.6	6.2	24	74.1	79.0	86.8	24	******	******	******	********
19-MAR-88	4.9	5.3	5.8	24	72.5	77.1	83.8	24	******	******	******	********
20-MAR-88	4.9	5.3	6.0	24	69.2	73.2	80.6	24	******	******	******	********
21-MAR-88	3.4	5.3	6.4	24	33.8	62.2	73.9	24	******	******	******	********
22-MAR-88	3.7	7.7	9.3	24	38.3	84.0	99.7	24	******	******	******	********
23-MAR-88	6.9	7.3	7.6	24	91.4	93.5	95.8	24	******	******	******	********
24-MAR-88	6.5	6.8	7.0	24	93.0	95.8	100.5	24	******	******	******	********
25-MAR-88	6.4	6.6	6.7	21	98.3	100.1	101.3	21	******	******	******	********
26-MAR-88	6.3	6.4	6.6	24	97.0	99.0	101.4	24	******	******	******	********
27-MAR-88	6.3	6.4	6.4	24	96.3	98.5	101.0	24	******	******	******	********
28-MAR-88	6.3	6.4	6.4	24	96.3	97.2	98.3	24	******	******	******	********
29-MAR-88	6.2	6.6	7.1	21	63.4	91.6	97.0	21	******	******	******	********
30-MAR-88	6.3	6.5	6.6	18	91.9	94.7	99.0	18	******	******	******	********
31-MAR-88	4.1	9.4	12.8	24	49.2	87.2	98.6	24	******	******	******	********
GRAND MONTHLY MEAN	7.8	8.7	9.3		74.2	82.9	88.1		0.0	0.0	0.0	

\# A day with less than 24 values.

**** No data values for that day.

@ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-APR-88 to 30-APR-88

	DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
		MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
#	1-APR-88	2.0	16.1	34.0	20	4.0	5.3	6.4	21	15.6	32.6	46.9	21
	2-APR-88	2.0	3.2	4.7	24	6.3	6.3	6.4	24	43.0	45.1	46.9	24
	3-APR-88	2.7	3.8	5.1	24	6.3	6.4	6.4	24	43.0	44.9	46.9	24
	4-APR-88	3.9	4.2	5.1	24	6.4	6.4	6.5	24	43.0	46.5	46.9	24
	5-APR-88	4.3	4.4	4.7	24	6.4	6.4	6.5	24	46.9	47.0	50.8	24
	6-APR-88	3.5	4.3	5.5	24	6.4	6.5	6.6	24	43.0	46.5	46.9	24
	7-APR-88	4.3	4.6	5.5	24	6.5	6.5	6.5	24	46.9	47.0	50.8	24
	8-APR-88	4.3	4.5	4.7	21	6.4	6.5	6.5	21	46.9	47.2	50.8	21
	9-APR-88	3.9	4.3	4.7	24	6.4	6.5	6.7	24	46.9	53.1	54.7	24
	10-APR-88	4.3	4.7	5.1	24	6.7	6.7	6.7	24	54.7	55.2	58.6	24
	11-APR-88	3.9	4.4	5.1	24	6.5	6.7	7.1	24	54.7	56.5	62.5	24
	12-APR-88	3.1	4.0	5.1	24	6.9	7.1	7.2	24	62.5	62.5	62.5	24
	13-APR-88	3.5	4.6	6.3	24	7.0	7.0	7.1	24	62.5	65.6	66.4	24
	14-APR-88	4.3	5.5	7.4	24	7.0	7.0	7.1	24	66.4	66.4	66.4	24
	15-APR-88	5.1	6.3	7.4	24	7.0	7.0	7.1	24	66.4	70.3	74.2	24
	16-APR-88	5.1	5.9	7.4	24	6.9	6.9	7.0	24	66.4	66.4	66.4	24
	17-APR-88	5.1	5.5	6.6	24	6.9	6.9	7.0	24	70.3	75.3	78.1	24
	18-APR-88	5.9	6.2	6.6	24	7.0	7.0	7.0	24	74.2	79.7	82.0	24
	19-APR-88	5.9	6.9	8.6	24	6.9	7.0	7.1	24	62.5	69.2	74.2	24
	20-APR-88	6.6	7.1	8.2	24	6.9	7.0	7.1	24	66.4	69.5	74.2	24
	21-APR-88	5.5	6.5	7.8	24	6.9	7.0	7.1	24	62.5	68.7	74.2	24
	22-APR-88	6.6	7.3	8.2	24	6.9	7.0	7.1	24	66.4	69.0	74.2	24
	23-APR-88	6.6	7.8	9.8	24	6.9	7.0	7.0	24	66.4	70.0	78.1	24
	24-APR-88	7.4	8.3	9.8	24	6.9	6.9	7.0	24	66.4	71.1	78.1	24
	25-APR-88	6.3	6.7	7.4	24	6.9	6.9	7.0	24	74.2	75.8	78.1	24
	26-APR-88	6.6	7.6	9.8	24	6.8	6.8	6.9	24	66.4	70.8	74.2	24
	27-APR-88	7.8	8.9	10.2	24	6.8	6.8	6.9	24	66.4	69.8	74.2	24
	28-APR-88	8.6	9.7	11.3	24	6.8	6.8	6.9	24	70.3	71.4	74.2	24
	29-APR-88	9.0	9.8	11.3	24	6.8	6.8	6.9	24	66.4	69.7	74.2	24
	30-APR-88	9.0	9.1	9.4	24	6.8	6.8	6.8	24	66.4	70.1	70.3	24
	GRAND MONTHLY MEAN	5.2	6.4	8.1		6.6	6.7	6.9		58.5	61.8	65.2	

\# A day with less than 24 values.

**** No data values for that day.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-APR-88 to 30-APR-88

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
# 1-APR-88	6.3	7.9	13.1	21	63.7	81.9	99.4	21	******	******	******	********
2-APR-88	8.6	8.9	9.5	24	64.0	68.9	75.8	24	******	******	******	********
3-APR-88	9.2	9.5	10.0	24	70.2	74.8	81.1	24	******	******	******	********
4-APR-88	9.8	10.0	10.0	24	77.3	79.2	81.7	24	******	******	******	********
5-APR-88	9.9	10.1	10.2	24	79.6	80.4	81.2	24	******	******	******	********
6-APR-88	10.0	10.5	11.2	24	77.8	83.9	92.2	24	******	******	******	********
7-APR-88	10.8	11.0	11.3	24	86.2	88.7	92.2	24	******	******	******	********
8-APR-88	11.0	11.2	11.3	21	88.1	89.5	90.9	21	******	******	******	********
9-APR-88	11.0	11.2	11.5	24	87.4	89.6	92.8	24	******	******	******	********
10-APR-88	11.4	11.5	11.7	24	91.2	92.9	95.0	24	******	******	******	********
11-APR-88	11.4	11.6	12.3	24	90.2	92.7	99.0	24	******	******	******	********
12-APR-88	12.1	12.4	12.8	24	93.2	97.9	103.8	24	******	******	******	********
13-APR-88	12.4	12.6	12.8	24	96.6	101.4	107.7	24	******	******	******	********
14-APR-88	12.4	12.6	12.8	24	98.6	103.6	109.7	24	******	******	******	********
15-APR-88	12.3	12.5	12.7	24	100.0	105.1	109.7	24	******	******	******	********
16-APR-88	12.0	12.2	12.6	24	97.5	101.6	109.0	24	******	******	******	********
17-APR-88	11.9	12.1	12.3	24	96.9	99.1	104.2	24	******	******	******	********
18-APR-88	12.0	12.1	12.3	24	99.6	101.8	103.5	24	******	******	******	********
19-APR-88	12.0	12.2	12.4	24	100.2	104.0	109.5	24	******	******	******	********
20-APR-88	11.9	12.0	12.3	24	100.9	103.3	108.5	24	******	******	******	********
21-APR-88	11.8	12.0	12.1	24	97.2	101.5	106.1	24	******	******	******	********
22-APR-88	11.8	11.9	12.1	24	100.2	102.9	106.4	24	******	******	******	********
23-APR-88	11.9	12.1	12.2	24	100.9	105.4	112.1	24	******	******	******	********
24-APR-88	11.6	11.8	12.1	24	101.3	104.3	111.5	24	******	******	******	********
25-APR-88	11.5	11.7	11.9	24	96.7	99.6	102.3	24	******	******	******	********
26-APR-88	11.6	11.9	12.1	24	98.3	103.2	110.7	24	******	******	******	********
27-APR-88	11.4	11.7	11.9	24	99.2	105.1	109.6	24	******	******	******	********
28-APR-88	11.4	11.6	11.7	24	101.2	106.0	112.1	24	******	******	******	********
29-APR-88	11.1	11.4	11.6	24	100.9	104.4	110.6	24	******	******	******	********
30-APR-88	10.9	11.1	11.3	24	98.1	100.4	102.6	24	******	******	******	********
GRAND MONTHLY MEAN	11.1	11.4	11.8		91.8	95.8	101.0		0.0	0.0	0.0	

\# A day with less than 24 values.

**** No data values for that day.

@ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-MAY-88 to 31-MAY-88

	DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
		MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
#	1-MAY-88	9.0	9.5	10.2	21	6.7	6.8	6.8	21	66.4	67.3	70.3	21
	2-MAY-88	9.0	9.4	10.2	24	6.7	6.7	6.8	24	58.6	62.3	66.4	24
	3-MAY-88	8.2	8.8	9.4	24	6.7	6.8	6.9	24	66.4	68.5	70.3	24
	4-MAY-88	8.6	9.3	10.6	24	6.9	6.9	6.9	24	66.4	70.1	70.3	24
	5-MAY-88	9.0	10.6	12.9	24	6.8	6.9	6.9	24	66.4	70.3	74.2	24
	6-MAY-88	10.6	11.9	13.3	24	6.8	6.9	6.9	24	74.2	75.2	78.1	24
	7-MAY-88	11.3	12.5	13.7	24	6.9	6.9	6.9	24	74.2	75.8	78.1	24
	8-MAY-88	11.3	12.9	14.5	24	6.9	6.9	6.9	24	74.2	77.6	78.1	24
	9-MAY-88	12.5	13.9	15.2	24	6.8	6.9	6.9	24	78.1	79.6	82.0	24
	10-MAY-88	12.5	13.8	15.2	18	6.9	6.9	6.9	18	78.1	80.9	82.0	18
	11-MAY-88	13.3	14.1	15.2	21	6.8	6.8	6.9	21	78.1	78.9	82.0	21
	12-MAY-88	13.3	14.4	16.8	24	6.8	6.8	6.9	24	82.0	84.6	89.8	24
	13-MAY-88	14.5	15.8	17.2	24	6.8	6.8	6.9	24	74.2	77.5	82.0	24
	14-MAY-88	15.2	16.3	17.2	24	6.9	6.9	7.0	24	74.2	77.9	85.9	24
	15-MAY-88	15.6	16.4	16.8	18	6.9	7.0	7.0	18	85.9	97.2	101.6	18
	16-MAY-88	15.6	16.1	16.8	24	6.9	6.9	7.0	24	89.8	95.7	101.6	24
	17-MAY-88	15.6	16.0	16.4	24	6.9	6.9	7.0	24	89.8	92.3	97.6	24
	18-MAY-88	15.6	15.8	16.0	24	6.8	6.8	6.9	24	93.7	97.6	101.6	24
	19-MAY-88	14.8	15.6	16.8	24	6.8	6.8	6.9	24	89.8	93.4	101.6	24
	20-MAY-88	16.4	16.7	17.2	21	6.7	6.8	6.9	21	74.2	78.3	89.8	21
	21-MAY-88	17.2	17.2	17.2	9	6.8	6.8	6.8	9	78.1	80.7	85.9	9
	~~27-MAY-88~~	~~21.1~~	~~22.9~~	~~24.6~~	~~9~~	~~4.0~~	~~4.0~~	~~4.0~~	~~9~~	~~19.5~~	~~19.5~~	~~19.5~~	~~9~~
	28-MAY-88	23.4	24.4	25.0	~~12~~	4.0	4.0	4.0	~~12~~	15.6	19.2	19.5	12
	30-MAY-88	23.4	24.1	24.6	~~15~~	4.0	4.0	4.0	~~15~~	15.6	19.3	19.5	15
	~~31-MAY-88~~	~~22.3~~	~~23.4~~	~~24.6~~	~~18~~	~~4.0~~	~~4.0~~	~~4.0~~	~~18~~	~~15.6~~	~~19.3~~	~~19.5~~	~~18~~
	GRAND MONTHLY MEAN	14.4	15.3	16.3		6.4	6.4	6.4		67.2	70.4	73.9	

\# A day with less than 24 values.

**** No data values for that day.

pump failure

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-MAY-88 to 31-MAY-88

28-Mar-89 ENVIRONMENT CANADA WATER QUALITY BRANCH - MONCTON

	DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
		MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
#	1-MAY-88	11.0	11.2	11.4	21	98.8	101.9	106.0	21	******	******	******	********
	2-MAY-88	11.1	11.3	11.4	24	100.9	102.5	106.0	24	******	******	******	********
	3-MAY-88	11.2	11.3	11.5	24	98.9	101.5	104.7	24	******	******	******	********
	4-MAY-88	11.3	11.4	11.6	24	100.6	103.9	108.5	24	******	******	******	********
	5-MAY-88	11.1	11.3	11.5	24	100.9	106.3	113.3	24	******	******	******	********
	6-MAY-88	10.9	11.1	11.3	24	102.0	107.3	112.1	24	******	******	******	********
	7-MAY-88	10.7	10.9	11.0	24	102.5	106.8	110.7	24	******	******	******	********
	8-MAY-88	10.6	10.8	10.9	24	100.9	106.6	112.0	24	******	******	******	********
	9-MAY-88	10.3	10.5	10.7	24	101.6	106.7	111.6	24	******	******	******	********
	10-MAY-88	10.1	10.2	10.3	18	99.3	103.6	108.4	18	******	******	******	********
	11-MAY-88	9.8	9.9	10.3	21	98.1	101.0	107.5	21	******	******	******	********
	12-MAY-88	9.7	9.9	10.1	24	96.6	101.1	108.9	24	******	******	******	********
	13-MAY-88	9.5	9.7	10.0	24	96.8	102.4	108.1	24	******	******	******	********
	14-MAY-88	9.1	9.5	9.8	24	95.4	101.9	107.3	24	******	******	******	********
	15-MAY-88	9.3	9.6	9.8	18	98.7	102.7	105.5	18	******	******	******	********
	16-MAY-88	9.3	9.4	9.7	24	97.9	100.4	104.7	24	******	******	******	********
	17-MAY-88	9.1	9.2	9.5	24	96.2	98.0	100.4	24	******	******	******	********
	18-MAY-88	8.9	9.0	9.2	24	93.7	95.5	97.9	24	******	******	******	********
	19-MAY-88	9.0	9.1	9.3	24	93.7	95.7	98.8	24	******	******	******	********
	20-MAY-88	8.5	8.6	9.0	21	91.2	93.4	97.1	21	******	******	******	********
	21-MAY-88	8.3	8.4	8.5	9	90.3	91.8	92.8	9	******	******	******	********
	27-MAY-88	8.3	8.4	8.5	9	100.2	103.6	106.9	9	******	******	******	********
	28-MAY-88	8.1	8.3	8.4	12	101.3	105.5	107.7	12	******	******	******	********
	30-MAY-88	7.7	7.8	7.9	15	96.5	98.6	100.9	15	******	******	******	********
	31-MAY-88	7.7	7.8	7.8	18	94.2	97.1	99.9	18	******	******	******	********
	GRAND MONTHLY MEAN	9.6	9.8	10.0		97.9	101.4	105.5		0.0	0.0	0.0	

\# A day with less than 24 values.

**** No data values for that day.

@ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

SUMMARY OF DAILY AMGM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-JUN-88 to 30-JUN-88

07-Apr-89 ENVIRONMENT CANADA WATER QUALITY BRANCH - MONCTON

DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-JUN-88	****	****	****	**	****	****	****	**	******	******	******	**
2-JUN-88	****	****	****	**	****	****	****	**	******	******	******	**
3-JUN-88	17.2	17.4	18.0	7	6.8	7.0	7.1	0	105.5	108.2	109.4	0
4-JUN-88	16.8	17.3	18.0	21	6.9	7.0	7.0	0	97.6	102.1	105.5	0
5-JUN-88	18.0	18.3	18.4	6	7.0	7.0	7.0	0	105.5	105.5	105.5	0
6-JUN-88	16.8	17.0	17.6	15	7.0	7.0	7.1	0	113.3	124.5	128.9	0
7-JUN-88	16.0	16.8	17.2	21	7.1	7.1	7.1	10	128.9	136.7	140.6	10
8-JUN-88	16.0	16.5	17.2	21	7.1	7.1	7.1	21	125.0	139.9	148.4	21
9-JUN-88	16.4	16.7	16.8	6	7.0	7.0	7.1	6	117.2	121.1	125.0	6
10-JUN-88	16.0	16.6	17.2	15	7.0	7.0	7.1	15	125.0	128.6	132.8	15
11-JUN-88	16.4	17.4	19.1	21	7.0	7.1	7.1	21	132.8	143.9	152.3	21
12-JUN-88	18.4	19.0	19.9	21	7.1	7.1	7.2	21	148.4	150.8	156.2	21
13-JUN-88	19.1	20.8	22.3	15	7.1	7.2	7.3	15	152.3	154.4	156.2	15
14-JUN-88	20.7	21.2	21.9	24	7.1	7.2	7.2	24	152.3	155.2	156.2	24
15-JUN-88	21.5	21.8	23.0	18	7.2	7.2	7.2	18	152.3	155.4	156.2	18
16-JUN-88	21.9	23.2	24.2	21	7.1	7.1	7.2	21	140.6	146.2	156.2	21
17-JUN-88	20.7	22.6	23.0	21	7.0	7.1	7.1	21	144.5	151.0	156.2	21
18-JUN-88	19.5	20.2	21.1	21	7.0	7.0	7.1	21	152.3	153.4	156.2	21
19-JUN-88	20.7	21.7	22.6	18	7.1	7.1	7.2	18	152.3	158.0	160.1	18
20-JUN-88	22.3	22.3	22.3	6	7.1	7.1	7.1	6	160.1	160.1	160.1	6
21-JUN-88	****	****	****	**	****	****	****	**	******	******	******	**
22-JUN-88	****	****	****	**	****	****	****	**	******	******	******	**
23-JUN-88	23.0	24.1	25.0	15	7.0	7.0	7.1	15	156.2	160.1	164.0	15
24-JUN-88	21.1	21.9	23.0	21	7.0	7.0	7.1	21	156.2	161.4	167.9	21
25-JUN-88	21.1	21.4	21.5	6	7.0	7.0	7.1	6	164.0	167.3	167.9	6
26-JUN-88	19.5	19.9	20.3	12	7.0	7.0	7.1	12	164.0	167.6	167.9	12
27-JUN-88	19.9	20.4	21.5	24	7.0	7.1	7.3	24	164.0	167.5	171.9	24
28-JUN-88	20.7	21.3	22.3	21	7.2	7.2	7.3	21	167.9	170.2	171.9	21
29-JUN-88	21.1	21.4	21.5	6	7.2	7.2	7.2	6	167.9	168.6	171.9	6
30-JUN-88	****	****	****	**	****	****	****	**	******	******	******	**
GRAND MONTHLY MEAN	19.2	19.9	20.6		7.0	7.1	7.1		141.8	146.3	149.8	

\# A day with less than 24 values.

**** No data values for that day.

Pump Failure

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-JUN-88 to 30-JUN-88

07-Apr-89 ENVIRONMENT CANADA WATER QUALITY BRANCH - MONCTON

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-JUN-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
2-JUN-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
3-JUN-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
4-JUN-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
5-JUN-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
6-JUN-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
7-JUN-88	7.2	7.3	7.4	21	77.9	79.2	80.5	21	******	******	******	**
8-JUN-88	7.1	7.3	7.6	21	75.0	78.6	81.9	21	******	******	******	**
9-JUN-88	7.4	7.5	7.5	6	79.8	81.0	81.3	6	******	******	******	**
10-JUN-88	7.4	7.6	7.8	15	78.8	81.8	84.8	15	******	******	******	**
11-JUN-88	6.4	6.7	7.8	21	68.9	74.0	84.2	21	******	******	******	**
12-JUN-88	6.6	6.8	7.0	21	74.0	77.5	80.6	21	******	******	******	**
13-JUN-88	7.0	7.0	7.1	15	79.5	83.2	87.0	15	******	******	******	**
14-JUN-88	6.8	6.9	7.0	24	80.3	82.4	84.0	24	******	******	******	**
15-JUN-88	6.9	7.0	7.1	18	82.1	84.1	86.5	18	******	******	******	**
16-JUN-88	6.9	7.1	7.2	21	85.3	87.6	89.6	21	******	******	******	**
17-JUN-88	6.6	6.9	7.1	21	78.3	84.5	88.0	21	******	******	******	**
18-JUN-88	6.7	6.8	7.0	21	76.9	79.0	82.8	21	******	******	******	**
19-JUN-88	6.9	7.1	7.2	18	82.3	85.1	88.9	18	******	******	******	**
20-JUN-88	7.1	7.2	7.2	6	86.6	87.1	87.5	6	******	******	******	**
21-JUN-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
22-JUN-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
23-JUN-88	7.1	7.2	7.3	15	89.9	91.8	94.3	15	******	******	******	**
24-JUN-88	7.0	7.2	7.3	21	83.2	86.5	90.1	21	******	******	******	**
25-JUN-88	7.3	7.3	7.3	6	86.8	87.4	87.8	6	******	******	******	**
26-JUN-88	7.2	7.4	7.5	12	82.9	85.4	87.0	12	******	******	******	**
27-JUN-88	7.4	7.5	7.7	24	86.3	88.3	92.0	24	******	******	******	**
28-JUN-88	7.6	7.7	7.9	21	89.3	92.0	95.0	21	******	******	******	**
29-JUN-88	7.3	7.3	7.4	6	86.4	87.8	88.7	6	******	******	******	**
30-JUN-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
GRAND MONTHLY MEAN	7.0	7.2	7.4		81.5	84.0	86.8		0.0	0.0	0.0	

\# A day with less than 24 values.

**** No data values for that day.

@ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

Pump Failure

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-JUL-88 to 31-JUL-88

DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-JUL-88	****	****	****	**	****	****	****	**	******	******	******	**
2-JUL-88	****	****	****	**	****	****	****	**	******	******	******	**
3-JUL-88	20.7	21.1	21.5	10	7.1	7.1	7.1	10	144.5	144.5	144.5	10
4-JUL-88	21.1	21.8	22.6	24	7.0	7.0	7.1	24	144.5	148.6	152.3	24
5-JUL-88	21.5	22.3	23.0	21	7.0	7.1	7.1	21	148.4	150.6	152.3	21
6-JUL-88	22.3	23.1	23.8	18	7.0	7.1	7.1	18	152.3	153.8	156.2	18
7-JUL-88	22.3	23.1	23.8	24	7.0	7.0	7.1	24	148.4	152.3	156.2	24
8-JUL-88	23.4	23.7	24.6	14	7.0	7.0	7.1	14	152.3	153.4	156.2	14
9-JUL-88	****	****	****	**	****	****	****	**	******	******	******	**
10-JUL-88	24.6	25.2	25.8	10	6.9	6.9	7.0	10	156.2	159.7	160.1	10
11-JUL-88	24.2	24.7	25.8	21	6.9	6.9	6.9	21	156.2	160.7	167.9	21
12-JUL-88	24.6	25.2	26.2	24	6.8	6.9	6.9	24	164.0	166.8	171.9	24
13-JUL-88	24.6	25.5	26.6	21	6.8	6.8	6.9	21	167.9	172.0	175.8	21
14-JUL-88	25.8	25.8	25.8	5	6.8	6.8	6.9	5	171.9	174.2	175.8	5
15-JUL-88	22.6	23.3	23.8	16	6.8	6.9	6.9	16	109.4	122.5	152.3	16
16-JUL-88	23.4	24.1	24.6	21	6.9	7.0	7.1	21	109.4	133.5	156.2	21
17-JUL-88	22.6	23.3	23.8	18	7.0	7.0	7.1	18	148.4	154.7	160.1	18
18-JUL-88	23.4	24.7	26.2	21	7.0	7.1	7.2	21	160.1	162.0	164.0	21
19-JUL-88	24.6	25.5	25.8	21	7.0	7.0	7.1	21	148.4	152.1	160.1	21
20-JUL-88	23.4	24.2	24.6	21	6.9	6.9	7.0	21	128.9	137.3	148.4	21
21-JUL-88	23.8	24.6	25.0	21	6.9	6.9	7.0	21	128.9	140.4	148.4	21
22-JUL-88	23.0	23.2	23.8	20	6.9	6.9	7.0	20	136.7	138.7	144.5	20
23-JUL-88	23.4	24.1	24.6	16	6.9	6.9	7.0	16	136.7	143.5	148.4	16
24-JUL-88	22.6	24.3	25.0	21	6.9	6.9	7.0	21	144.5	148.2	152.3	21
25-JUL-88	22.3	22.4	22.6	5	6.9	6.9	6.9	5	144.5	144.5	144.5	5
26-JUL-88	21.9	22.5	22.6	16	6.9	7.0	7.0	16	152.3	155.2	156.2	16
27-JUL-88	21.5	22.1	22.6	21	6.9	6.9	7.0	21	152.3	152.3	152.3	21
28-JUL-88	21.1	21.6	21.9	20	6.9	6.9	6.9	20	148.4	151.9	156.2	20
29-JUL-88	22.3	23.0	23.8	16	6.9	6.9	7.0	16	148.4	155.0	160.1	16
30-JUL-88	23.4	24.1	24.6	21	6.9	7.0	7.1	21	148.4	157.3	164.0	21
31-JUL-88	23.0	23.6	24.2	21	6.9	7.0	7.0	21	156.2	159.9	164.0	21
GRAND MONTHLY MEAN	23.0	23.6	24.2		6.9	7.0	7.0		146.7	151.6	157.2	

\# A day with less than 24 values.

**** No data values for that day.

SUMMARY OF DAILY AMOM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-JUL-88 to 31-JUL-88

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-JUL-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
2-JUL-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
3-JUL-88	7.5	7.6	7.8	10	89.1	90.8	92.8	10	861.8	866.2	869.1	10
4-JUL-88	7.2	7.4	7.6	24	86.9	89.1	90.8	24	840.0	849.8	861.8	24
5-JUL-88	7.1	7.4	7.5	21	86.6	89.8	91.9	21	831.7	837.4	847.2	20
6-JUL-88	6.8	7.1	7.3	18	83.5	87.8	90.6	18	831.7	834.7	840.0	17
7-JUL-88	6.6	6.9	7.1	24	81.9	85.5	87.8	24	826.8	831.4	831.7	21
8-JUL-88	6.6	6.8	6.9	14	82.9	85.7	87.1	14	818.8	826.8	831.7	14
9-JUL-88	****	****	****	**	*****	*****	*****	**	******	******	******	**
10-JUL-88	5.9	6.1	6.4	10	74.9	78.5	83.3	10	818.8	826.2	831.7	10
11-JUL-88	5.7	6.1	6.3	21	73.5	78.1	81.9	21	831.7	839.3	845.4	18
12-JUL-88	5.6	5.9	6.2	24	71.6	76.9	79.8	24	806.0	820.2	861.8	24
13-JUL-88	5.5	5.8	5.9	21	71.0	75.2	78.4	21	843.6	846.5	847.2	5
14-JUL-88	5.5	5.7	5.8	5	71.6	74.1	75.7	5	******	******	******	**
15-JUL-88	5.6	6.1	6.6	16	68.2	76.4	82.7	16	869.1	970.9	1394.2	15
16-JUL-88	6.0	6.3	6.6	21	74.7	80.4	83.5	21	840.0	854.7	869.1	18
17-JUL-88	6.0	6.2	6.4	18	74.7	77.0	79.8	18	831.7	834.1	847.2	17
18-JUL-88	6.0	6.2	6.5	21	75.1	80.1	85.9	21	831.7	892.2	1133.5	20
19-JUL-88	5.7	6.0	6.4	21	72.7	78.7	84.4	21	840.0	968.7	1172.1	20
20-JUL-88	5.8	6.1	6.4	21	73.0	77.7	82.0	21	840.0	900.2	1172.1	20
21-JUL-88	5.7	6.1	6.4	21	72.4	78.4	82.2	21	840.0	872.7	913.5	20
22-JUL-88	5.8	6.2	6.4	20	73.2	77.2	79.1	20	833.3	916.3	951.2	17
23-JUL-88	6.0	6.2	6.3	16	76.2	78.9	80.5	16	831.7	875.1	936.0	15
24-JUL-88	5.8	6.0	6.2	21	70.8	75.8	80.0	21	883.8	916.7	936.0	21
25-JUL-88	5.8	5.9	5.9	5	71.8	72.0	72.1	5	947.4	954.6	958.8	5
26-JUL-88	6.0	6.1	6.3	16	73.4	75.0	77.2	16	943.6	946.6	955.0	16
27-JUL-88	6.0	6.1	6.2	21	72.0	74.3	75.9	21	854.5	971.0	1219.5	21
28-JUL-88	6.0	6.2	6.3	20	72.0	74.4	75.8	20	845.4	876.1	1036.0	17
29-JUL-88	6.1	6.3	6.5	16	75.7	77.6	81.2	16	831.7	875.9	943.6	16
30-JUL-88	6.0	6.2	6.4	21	76.5	78.9	81.3	21	831.7	865.7	936.0	20
31-JUL-88	6.1	6.2	6.4	21	75.1	78.2	80.1	21	936.0	938.3	943.6	19
GRAND MONTHLY MEAN	6.1	6.3	6.5		75.8	79.4	82.3		849.7	881.8	955.0	

\# A day with less than 24 values.

**** No data values for that day.

@ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-AUG-88 to 31-AUG-88

DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-AUG-88	23.0	23.7	24.6	21	6.9	7.0	7.0	21	148.4	151.2	152.3	21
2-AUG-88	24.2	25.1	26.2	21	6.9	7.0	7.1	21	148.4	152.5	156.2	21
3-AUG-88	25.0	25.7	26.2	15	6.9	7.0	7.0	15	148.4	151.5	152.3	15
4-AUG-88	24.6	25.0	25.4	24	6.9	7.0	7.1	24	148.4	153.6	156.2	24
5-AUG-88	25.4	26.6	27.3	21	6.9	7.0	7.1	21	148.4	151.8	156.2	21
6-AUG-88	26.6	27.2	27.7	21	6.9	6.9	7.0	21	136.7	149.3	156.2	21
7-AUG-88	25.0	26.7	27.7	21	6.8	6.9	7.0	21	128.9	134.1	136.7	21
8-AUG-88	25.0	25.5	26.6	21	6.7	6.8	6.9	21	109.4	127.2	140.6	21
9-AUG-88	25.4	25.9	26.6	21	6.7	6.8	6.9	21	105.5	108.6	113.3	21
10-AUG-88	26.2	26.4	27.0	21	6.8	6.8	6.9	21	113.3	127.4	132.8	21
11-AUG-88	26.2	26.7	27.0	21	6.8	6.8	6.9	21	125.0	128.9	132.8	21
12-AUG-88	27.0	27.2	27.7	21	6.9	6.9	6.9	21	113.3	119.8	125.0	21
13-AUG-88	27.7	27.7	27.7	5	6.9	6.9	6.9	5	117.2	117.2	117.2	5
14-AUG-88	25.8	26.8	27.3	16	6.9	6.9	6.9	16	128.9	133.0	136.7	16
15-AUG-88	23.4	24.5	25.8	21	6.8	6.8	6.9	21	132.8	133.3	136.7	21
16-AUG-88	23.4	23.6	23.8	5	6.8	6.8	6.8	5	125.0	132.0	136.7	5
17-AUG-88	22.6	22.8	23.0	16	6.7	6.7	6.8	16	93.7	95.7	97.6	16
18-AUG-88	22.3	22.7	23.0	21	6.7	6.8	6.8	21	89.8	92.6	93.7	21
19-AUG-88	21.1	21.9	22.6	21	6.8	6.8	6.9	21	93.7	98.2	101.6	21
20-AUG-88	22.3	22.4	22.6	5	6.9	6.9	6.9	5	97.6	100.8	101.6	5
21-AUG-88	19.9	20.7	21.9	16	6.8	6.8	6.9	16	93.7	95.9	97.6	16
22-AUG-88	19.1	19.8	20.3	18	6.8	6.8	6.9	18	97.6	102.0	109.4	18
23-AUG-88	19.5	20.1	20.7	21	6.9	6.9	7.0	21	97.6	113.3	128.9	21
24-AUG-88	19.9	20.3	20.7	21	7.0	7.0	7.1	21	128.9	135.0	136.7	21
25-AUG-88	18.7	19.8	20.3	21	6.9	7.0	7.1	21	125.0	131.3	140.6	21
26-AUG-88	18.4	19.2	20.3	21	6.9	6.9	7.0	21	128.9	133.0	136.7	21
27-AUG-88	20.3	20.6	21.5	21	6.9	6.9	6.9	21	101.6	111.6	125.0	21
28-AUG-88	19.9	20.9	21.5	21	6.8	6.9	6.9	21	109.4	115.9	117.2	21
29-AUG-88	19.9	20.2	20.7	12	6.8	6.9	6.9	12	117.2	121.4	125.0	12
30-AUG-88	19.9	20.2	20.3	24	6.9	6.9	7.0	24	105.5	128.1	132.8	24
31-AUG-88	19.1	20.1	21.5	23	6.7	6.8	6.9	23	78.1	82.9	97.6	23
GRAND MONTHLY MEAN												
	22.8	23.4	24.0		6.8	6.9	6.9		117.3	123.5	128.4	

\# A day with less than 24 values.

**** No data values for that day.

SUMMARY OF DAILY AMGM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-AUG-88 to 31-AUG-88

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-AUG-88	6.1	6.5	6.8	21	75.1	82.2	86.8	21	928.5	934.3	936.0	21
2-AUG-88	6.3	6.6	6.7	21	80.9	85.4	88.9	21	921.0	930.0	936.0	20
3-AUG-88	6.1	6.3	6.7	15	80.0	82.8	86.7	15	840.0	923.9	1166.0	14
4-AUG-88	5.6	6.3	6.7	24	72.2	81.5	87.3	24	936.0	984.3	1172.1	24
5-AUG-88	5.7	5.9	6.1	21	74.3	79.1	82.8	21	834.9	955.9	1180.3	20
6-AUG-88	5.6	5.9	6.3	21	75.2	79.2	84.4	21	1203.0	1214.6	1221.6	20
7-AUG-88	5.5	5.9	6.3	21	71.3	78.5	86.2	21	928.5	1108.0	1261.3	20
8-AUG-88	5.7	6.0	6.3	21	73.9	78.1	84.0	21	1344.3	1657.6	1752.1	20
9-AUG-88	6.1	6.2	6.4	21	79.7	81.6	85.0	21	898.6	1286.0	2981.3	20
10-AUG-88	6.3	6.4	6.4	21	82.7	84.7	86.4	21	907.9	946.2	966.4	20
11-AUG-88	5.8	6.2	6.5	21	77.4	82.2	86.9	21	943.6	1132.3	1246.6	20
12-AUG-88	5.8	6.1	6.5	21	77.7	81.7	88.7	21	1192.6	1302.1	1677.1	20
13-AUG-88	6.7	6.7	6.8	5	90.9	91.8	93.1	5	1039.9	1272.3	1603.9	5
14-AUG-88	6.0	6.2	6.4	16	80.2	83.6	86.7	16	1004.8	1011.7	1028.1	15
15-AUG-88	6.5	6.6	6.8	21	83.0	84.7	86.5	21	1012.6	1359.7	1898.5	20
16-AUG-88	6.8	6.8	6.8	5	85.4	85.7	86.2	5	1786.7	1864.5	1927.2	5
17-AUG-88	6.9	7.1	7.4	16	84.6	87.3	91.3	16	1487.2	1789.7	1956.3	12
18-AUG-88	6.7	7.0	7.2	21	82.0	86.1	89.0	21	1580.7	1633.3	1752.1	18
19-AUG-88	6.7	7.0	7.2	21	79.8	84.4	88.0	21	1580.7	1587.3	1599.2	17
20-AUG-88	7.1	7.2	7.4	5	87.5	88.6	89.7	5	1580.7	1580.7	1580.7	5
21-AUG-88	8.0	8.0	8.2	16	93.0	94.7	96.1	16	1280.3	1387.7	1580.7	15
22-AUG-88	7.4	8.3	8.6	18	86.0	96.5	100.7	18	928.5	1233.7	1862.4	18
23-AUG-88	7.5	7.6	7.7	21	86.5	88.6	90.7	21	921.0	924.2	928.5	20
24-AUG-88	7.5	7.7	7.8	21	88.1	89.9	90.9	21	913.5	976.9	1261.3	21
25-AUG-88	7.7	7.8	7.9	21	87.0	89.7	91.7	21	913.5	948.4	1012.6	18
26-AUG-88	7.6	7.7	7.8	21	86.2	88.2	90.2	21	1117.3	1302.1	1641.4	17
27-AUG-88	7.6	7.8	7.9	21	89.1	91.4	95.0	21	1075.4	1138.9	1416.1	20
28-AUG-88	7.3	7.5	8.0	21	85.6	89.2	96.0	21	1075.4	1078.7	1087.3	20
29-AUG-88	7.4	7.5	7.6	12	86.4	87.6	88.9	12	915.4	959.0	1073.4	11
30-AUG-88	7.4	7.6	7.6	24	86.4	88.0	89.1	24	921.0	1881.9	3051.2	24
31-AUG-88	7.5	7.7	7.9	23	85.9	89.4	95.0	23	2243.9	2404.9	2826.8	23
GRAND MONTHLY MEAN	6.7	6.9	7.1		82.4	85.9	89.3		1137.3	1281.0	1535.0	

\# A day with less than 24 values.

**** No data values for that day.

∂ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-SEP-88 to 30-SEP-88

	DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
		MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
#	1-SEP-88	19.5	20.7	21.5	21	6.7	6.8	6.9	21	78.1	81.6	82.0	21
	2-SEP-88	19.9	20.8	21.9	24	6.7	6.8	6.9	24	70.3	75.7	82.0	24
	3-SEP-88	20.3	20.9	21.5	21	6.7	6.8	6.8	21	74.2	74.2	74.2	21
	4-SEP-88	19.5	19.8	21.1	21	6.6	6.7	6.8	21	74.2	74.2	74.2	21
	5-SEP-88	18.4	19.2	19.9	21	6.7	6.7	6.8	21	70.3	78.7	89.8	21
	6-SEP-88	18.0	18.5	19.9	21	6.7	6.7	6.8	21	78.1	81.8	85.9	21
	7-SEP-88	17.6	17.8	18.0	6	6.7	6.7	6.7	6	70.3	74.9	78.1	6
	9-SEP-88	18.0	18.3	18.7	12	6.7	6.7	6.8	12	46.9	49.5	50.8	12
	10-SEP-88	18.7	19.2	19.5	24	6.7	6.8	6.8	24	50.8	54.2	58.6	24
	11-SEP-88	18.0	18.6	19.5	21	6.8	6.8	6.9	21	58.6	66.8	74.2	21
	12-SEP-88	17.2	17.9	18.4	21	6.7	6.8	6.9	21	66.4	69.2	74.2	21
	13-SEP-88	16.8	17.3	18.4	21	6.8	6.8	6.9	21	70.3	70.3	70.3	21
	14-SEP-88	16.4	17.0	17.6	15	6.7	6.8	6.9	15	70.3	72.6	74.2	15
	15-SEP-88	16.0	16.8	17.6	21	6.8	6.8	6.9	21	78.1	83.5	85.9	21
	16-SEP-88	14.8	15.8	16.4	21	6.8	6.8	6.9	21	85.9	85.9	85.9	21
	17-SEP-88	15.2	15.9	16.4	21	6.9	6.9	6.9	21	82.0	84.8	89.8	21
	18-SEP-88	15.6	16.0	16.4	21	6.9	6.9	7.0	21	93.7	102.5	105.5	21
	19-SEP-88	15.2	15.8	16.8	21	6.9	6.9	6.9	21	97.6	105.5	117.2	21
	20-SEP-88	16.4	16.7	17.2	21	6.9	6.9	7.0	21	93.7	102.1	117.2	21
	21-SEP-88	16.0	16.4	17.6	21	6.8	6.9	7.0	21	78.1	85.4	97.6	21
	22-SEP-88	15.6	16.0	16.0	15	6.9	6.9	7.0	15	85.9	85.9	85.9	15
	23-SEP-88	14.8	15.3	16.0	18	6.8	6.9	7.0	18	82.0	84.2	85.9	18
	24-SEP-88	14.8	15.0	15.2	15	6.9	6.9	6.9	15	85.9	87.0	89.8	15
	26-SEP-88	15.2	15.5	15.6	15	7.0	7.0	7.0	15	89.8	102.8	117.2	15
	27-SEP-88	15.2	15.4	15.6	15	6.9	7.0	7.1	15	93.7	100.8	113.3	15
	28-SEP-88	14.8	15.3	15.6	24	6.9	7.0	7.0	24	85.9	99.9	117.2	24
	29-SEP-88	13.7	14.4	15.2	21	6.8	6.9	7.0	21	85.9	90.2	97.6	21
	30-SEP-88	13.7	14.0	14.5	18	6.8	6.9	7.0	18	85.9	94.2	109.4	18
	GRAND MONTHLY MEAN	16.6	17.2	17.8		6.8	6.8	6.9		78.0	82.8	88.7	

\# A day with less than 24 values.

**** No data values for that day.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-SEP-88 to 30-SEP-88

	DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
		MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
#	1-SEP-88	7.3	7.5	7.7	21	84.1	88.5	92.6	21	2231.8	2501.0	3006.9	18
	2-SEP-88	7.2	7.4	7.9	24	83.3	87.9	95.3	24	2963.0	2983.7	3006.9	24
	3-SEP-88	6.9	7.3	7.8	21	80.3	86.7	93.6	21	2934.0	2945.9	2963.0	21
	4-SEP-88	7.3	7.4	7.5	21	83.4	85.3	88.2	21	2809.2	2905.1	2934.0	18
	5-SEP-88	7.3	7.5	7.9	21	82.2	85.2	91.4	21	1359.4	1809.6	2563.6	21
	6-SEP-88	7.5	7.8	8.1	21	84.7	87.9	91.4	21	1190.6	1298.0	1516.6	21
	7-SEP-88	8.2	8.3	8.3	6	91.0	91.4	91.9	6	1188.5	1193.3	1196.8	6
	9-SEP-88	8.2	8.3	8.4	12	91.0	92.7	94.4	12	1462.6	1529.5	1608.6	12
	10-SEP-88	8.1	8.2	8.4	24	90.9	93.4	95.3	24	1271.8	1556.0	1893.3	24
	11-SEP-88	7.7	8.1	8.4	21	87.3	91.4	96.1	21	1442.6	2011.6	2805.7	18
	12-SEP-88	8.1	8.3	8.4	21	87.8	91.7	94.5	21	2195.8	2550.3	2862.3	21
	13-SEP-88	8.2	8.3	8.4	21	88.7	90.7	93.6	21	2491.5	2771.0	2948.5	21
	14-SEP-88	8.1	8.3	8.5	15	87.8	90.7	93.7	15	2099.0	2444.7	2948.5	15
	15-SEP-88	8.3	8.4	8.7	21	88.7	91.1	93.7	21	2032.0	2071.6	2099.0	21
	16-SEP-88	8.7	8.8	8.9	21	89.7	92.8	95.4	21	1877.8	2007.6	2045.8	21
	17-SEP-88	8.6	8.8	9.0	21	91.3	93.1	96.2	21	989.4	1478.4	1959.0	21
	18-SEP-88	8.4	8.6	8.8	21	88.9	91.2	94.6	21	1276.0	1420.5	1507.5	21
	19-SEP-88	8.3	8.4	8.4	21	87.2	88.7	90.4	21	1091.3	1431.5	1739.9	21
	20-SEP-88	8.4	8.4	8.6	21	89.6	91.1	92.9	21	1480.5	1845.8	2231.8	21
	21-SEP-88	8.3	8.4	8.6	21	88.0	90.3	94.6	21	1722.8	1907.5	2056.9	21
	22-SEP-88	8.3	8.6	9.2	15	88.0	91.5	97.9	15	1996.6	2051.2	2065.3	15
	23-SEP-88	9.0	9.2	9.3	18	92.9	95.6	98.8	18	1691.4	1819.5	2054.1	18
	24-SEP-88	9.0	9.1	9.1	15	92.9	94.2	95.4	15	1636.7	1804.3	2004.7	12
	26-SEP-88	9.1	9.2	9.2	15	94.5	96.1	97.1	15	1067.5	1594.8	2068.1	15
	27-SEP-88	9.1	9.2	9.4	15	94.5	96.5	98.7	15	1034.0	1437.8	2054.1	15
	28-SEP-88	9.1	9.2	9.3	24	93.7	96.1	97.9	24	1322.8	1707.8	2054.1	24
	29-SEP-88	9.3	9.4	9.5	21	94.3	96.5	97.8	21	951.2	1396.0	2054.1	21
	30-SEP-88	9.4	9.4	9.5	18	94.3	95.6	97.7	18	1764.4	1894.8	1977.7	15
	GRAND MONTHLY MEAN	8.3	8.4	8.6		89.0	91.6	94.7		1699.1	1941.7	2222.4	

\# A day with less than 24 values.

**** No data values for that day.

@ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-OCT-88 to 31-OCT-88

DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-OCT-88	14.1	14.5	15.6	24	6.9	6.9	7.0	24	85.9	88.2	89.8	24
2-OCT-88	14.8	15.4	15.6	24	6.9	6.9	7.0	24	85.9	86.7	89.8	24
3-OCT-88	15.6	16.1	16.4	24	6.9	6.9	7.1	24	85.9	102.8	132.8	24
4-OCT-88	14.1	14.6	15.6	21	6.8	6.9	7.1	21	93.7	107.5	136.7	21
5-OCT-88	12.9	13.4	14.5	24	6.7	6.8	6.9	24	78.1	86.7	93.7	24
6-OCT-88	12.1	12.4	12.9	24	6.8	6.8	6.9	24	85.9	90.3	97.6	24
7-OCT-88	11.3	11.9	12.1	24	6.8	6.8	6.9	24	89.8	91.3	97.6	24
8-OCT-88	10.6	11.5	12.5	18	6.9	6.9	7.0	18	89.8	96.3	105.5	18
9-OCT-88	9.4	9.8	10.6	24	6.9	6.9	6.9	24	78.1	81.9	89.8	24
10-OCT-88	9.4	9.5	10.2	24	6.9	6.9	7.0	24	89.8	99.8	109.4	24
11-OCT-88	10.2	10.4	10.9	24	6.9	6.9	7.0	24	78.1	88.5	109.4	24
12-OCT-88	9.4	10.2	10.6	12	6.9	6.9	6.9	12	78.1	78.8	82.0	12
13-OCT-88	8.6	8.9	10.6	18	4.2	6.7	7.2	18	3.9	76.2	85.9	18
14-OCT-88	7.8	8.3	8.6	18	6.7	6.9	7.4	18	82.0	84.2	89.8	18
15-OCT-88	7.8	8.3	8.6	24	6.7	6.7	6.8	24	82.0	83.8	89.8	24
16-OCT-88	8.2	8.5	8.6	24	6.7	6.7	6.8	24	89.8	90.3	93.7	24
17-OCT-88	8.6	9.0	9.4	24	6.7	6.8	7.0	24	97.6	105.0	117.2	24
18-OCT-88	8.6	9.0	9.4	18	6.9	6.9	7.0	18	89.8	92.4	101.6	18
19-OCT-88	9.4	9.6	9.8	15	6.9	6.9	6.9	15	89.8	91.1	93.7	15
20-OCT-88	8.2	8.5	8.6	12	6.7	6.7	6.7	12	93.7	93.7	93.7	12
21-OCT-88	7.4	8.2	8.6	12	6.7	6.7	6.7	12	89.8	90.2	93.7	12
22-OCT-88	****	****	****	*****	****	****	****	*****	******	******	******	*******
23-OCT-88	8.6	8.6	8.6	3	6.7	6.7	6.7	3	85.9	87.2	89.8	3
24-OCT-88	7.8	8.1	8.6	24	6.5	6.6	6.8	24	85.9	99.8	113.3	24
25-OCT-88	8.6	9.2	9.8	24	6.6	6.7	6.8	24	85.9	93.4	113.3	24
26-OCT-88	8.2	8.7	9.8	24	6.4	6.5	6.7	24	78.1	79.2	85.9	24
27-OCT-88	****	****	****	*****	****	****	****	*****	******	******	******	*******
28-OCT-88	7.4	7.9	8.6	21	6.4	6.5	6.7	21	82.0	82.8	85.9	21
29-OCT-88	8.6	8.6	8.6	6	6.7	6.7	6.7	6	85.9	85.9	85.9	6
GRAND MONTHLY MEAN	9.9	10.3	10.9		6.7	6.8	6.9		83.0	90.1	98.8	

\# A day with less than 24 values.

**** No data values for that day.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-OCT-88 to 31-OCT-88

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-OCT-88	9.4	9.5	9.7	24	95.1	97.0	102.0	24	1977.7	1987.0	1988.5	24
2-OCT-88	9.3	9.5	9.8	24	96.2	99.6	103.6	24	943.6	1596.6	1988.5	24
3-OCT-88	8.9	9.2	9.5	24	93.7	97.4	100.3	24	936.0	1169.9	1961.6	24
4-OCT-88	8.7	9.1	9.5	21	91.3	93.2	96.8	21	1801.7	2211.1	2963.0	21
5-OCT-88	9.2	9.4	9.7	24	92.7	94.0	96.8	24	1516.6	1776.4	2018.3	24
6-OCT-88	9.6	9.7	9.8	24	93.1	94.6	96.3	24	1571.4	1713.3	1903.7	24
7-OCT-88	9.8	9.8	9.9	24	92.8	95.0	96.1	24	1155.8	1533.4	1903.7	24
8-OCT-88	9.8	9.9	10.0	18	92.7	94.2	96.3	18	1207.1	1746.6	1999.3	18
9-OCT-88	9.8	9.9	10.0	24	89.9	91.2	94.0	24	1163.9	1475.8	1935.1	24
10-OCT-88	9.9	10.0	10.1	24	89.9	91.7	93.1	24	1246.6	1512.0	2037.5	24
11-OCT-88	10.1	10.2	10.3	24	93.7	94.7	96.4	24	1811.7	2007.1	2065.3	24
12-OCT-88	10.1	10.2	10.3	12	91.9	94.9	96.2	12	2054.1	2054.1	2054.1	13
13-OCT-88	0.5	9.7	10.3	18	4.4	86.7	94.1	18	1476.0	1753.9	2032.0	20
14-OCT-88	10.3	10.3	10.5	18	89.8	91.8	93.0	18	2021.1	2034.1	2043.1	15
15-OCT-88	10.3	10.4	10.6	24	90.5	92.4	94.3	24	1496.2	1758.8	2029.3	24
16-OCT-88	10.3	10.5	10.7	24	92.1	93.3	95.0	24	1238.3	1447.5	1762.0	24
17-OCT-88	10.4	10.4	10.6	24	93.0	94.4	96.2	24	1123.4	1355.8	1967.0	22
18-OCT-88	10.3	10.4	10.6	18	92.3	94.1	95.6	18	1141.6	1808.9	1988.5	20
19-OCT-88	10.2	10.4	10.6	15	92.7	95.5	97.1	15	1814.2	1980.8	2032.0	16
20-OCT-88	10.2	10.3	10.4	12	90.0	91.8	93.0	12	2012.9	2144.5	2292.6	11
21-OCT-88	10.2	10.3	10.4	12	88.9	91.1	93.0	12	1880.4	1994.6	2121.8	13
22-OCT-88	****	****	****	*****	*****	*****	*****	******	******	******	******	*******
23-OCT-88	10.0	10.0	10.0	3	88.8	89.0	89.5	3	1232.0	1240.3	1248.7	2
24-OCT-88	9.8	10.0	10.0	24	85.8	87.4	89.5	24	1205.0	1543.6	1945.7	21
25-OCT-88	9.7	9.9	10.2	24	86.9	89.6	90.9	24	1977.7	2630.6	3329.8	24
26-OCT-88	9.5	9.6	9.8	24	83.1	85.9	90.0	24	2280.4	2474.1	2784.7	22
27-OCT-88	****	****	****	*****	*****	*****	*****	******	******	******	******	*******
28-OCT-88	9.6	9.8	10.0	21	82.8	85.6	88.1	21	1964.3	2128.8	2249.9	20
29-OCT-88	10.0	10.0	10.1	6	89.5	89.6	90.1	6	1956.3	1961.7	1967.0	4
GRAND MONTHLY MEAN	9.5	9.9	10.1		87.5	92.4	94.7		1563.2	1816.3	2096.8	

\# A day with less than 24 values.

**** No data values for that day.

@ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

SUMMARY OF DAILY AMOM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-NOV-88 to 30-NOV-88

DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-NOV-88	****	****	****	*****	****	****	****	*****	******	******	******	*******
2-NOV-88	****	****	****	*****	****	****	****	*****	******	******	******	*******
3-NOV-88	****	****	****	*****	****	****	****	*****	******	******	******	*******
4-NOV-88	****	****	****	*****	****	****	****	*****	******	******	******	*******
5-NOV-88	****	****	****	*****	****	****	****	*****	******	******	******	*******
6-NOV-88	7.8	8.4	8.6	9	6.5	6.5	6.5	9	62.5	62.5	62.5	9
7-NOV-88	7.8	8.2	8.6	24	6.5	6.5	6.5	24	62.5	62.7	66.4	24
8-NOV-88	7.8	8.2	8.6	24	6.4	6.4	6.5	24	66.4	69.3	70.3	24
9-NOV-88	7.8	7.9	8.2	21	6.4	6.4	6.4	21	70.3	70.9	74.2	21
10-NOV-88	7.8	7.9	8.2	11	6.4	6.4	6.4	11	70.3	70.3	70.3	11
11-NOV-88	8.2	8.2	8.2	12	6.5	6.5	6.5	12	70.3	73.2	74.2	12
12-NOV-88	6.3	6.8	7.8	24	6.4	6.5	6.5	24	70.3	72.1	74.2	24
13-NOV-88	5.5	6.0	6.6	24	6.4	6.5	6.7	24	70.3	70.6	74.2	24
14-NOV-88	5.9	6.3	6.6	21	6.5	6.6	6.7	21	66.4	74.0	97.6	21
15-NOV-88	5.9	6.0	6.6	24	6.5	6.6	6.7	24	70.3	78.1	97.6	24
16-NOV-88	5.1	5.6	5.9	18	6.5	6.5	6.7	18	70.3	70.7	74.2	18
17-NOV-88	5.5	5.7	5.9	12	6.6	6.7	6.7	12	70.3	70.3	70.3	12
18-NOV-88	5.1	5.3	5.5	12	6.5	6.5	6.5	12	70.3	71.0	74.2	12
19-NOV-88	3.9	4.5	5.1	24	6.5	6.5	6.5	24	70.3	70.3	70.3	24
20-NOV-88	3.9	4.1	4.3	18	6.5	6.6	6.7	18	70.3	70.3	70.3	18
21-NOV-88	3.5	3.9	3.9	23	6.5	6.6	6.7	23	70.3	70.3	70.3	23
22-NOV-88	2.7	3.2	3.9	17	6.5	6.6	6.7	17	66.4	68.7	70.3	17
23-NOV-88	2.0	2.5	3.1	24	6.5	6.6	6.8	24	66.4	68.7	74.2	24
24-NOV-88	1.6	1.9	2.7	24	6.6	6.7	6.8	24	70.3	70.3	70.3	24
25-NOV-88	0.4	0.8	1.6	24	6.7	6.7	6.8	24	70.3	73.7	78.1	24
26-NOV-88	0.4	0.8	1.2	18	6.5	6.6	6.7	18	66.4	69.0	70.3	18
27-NOV-88	0.4	0.7	1.2	24	6.5	6.6	6.7	24	66.4	68.7	70.3	24
28-NOV-88	1.6	1.7	2.0	24	6.7	6.7	6.7	24	70.3	70.3	70.3	24
29-NOV-88	2.0	2.0	2.0	12	6.5	6.7	6.7	12	70.3	70.3	70.3	12
30-NOV-88	1.2	1.4	1.6	3	6.7	6.7	6.7	3	66.4	66.4	66.4	3
GRAND MONTHLY MEAN	4.4	4.7	5.1		6.5	6.6	6.6		68.6	70.1	73.3	

\# A day with less than 24 values.

**** No data values for that day.

Computer down.

SUMMARY OF DAILY AWQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-NOV-88 to 30-NOV-88

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-NOV-88	****	****	****	*****	*****	*****	*****	******	******	******	******	*******
2-NOV-88	****	****	****	*****	*****	*****	*****	******	******	******	******	*******
3-NOV-88	****	****	****	*****	*****	*****	*****	******	******	******	******	*******
4-NOV-88	****	****	****	*****	*****	*****	*****	******	******	******	******	*******
5-NOV-88	****	****	****	*****	*****	*****	*****	******	******	******	******	*******
6-NOV-88	10.7	10.7	10.7	9	93.9	95.3	95.7	9	4224.1	4300.0	4579.0	10
7-NOV-88	10.3	10.6	10.8	24	91.6	93.1	95.5	24	3217.2	3919.6	4297.3	24
8-NOV-88	10.2	10.3	10.4	24	89.1	90.6	92.3	24	3201.9	3209.5	3217.2	24
9-NOV-88	10.2	10.3	10.3	21	89.1	89.8	91.4	21	3186.6	3189.8	3201.9	24
10-NOV-88	9.9	10.1	10.2	11	86.2	88.2	90.0	11	2805.7	2904.4	3186.6	10
11-NOV-88	10.0	10.2	10.3	12	88.6	90.1	91.4	12	3036.4	3157.9	3232.6	11
12-NOV-88	10.1	10.3	10.5	24	84.9	87.6	89.8	24	3186.6	3205.9	3221.1	24
13-NOV-88	10.4	10.5	10.6	24	85.8	87.4	88.8	24	2992.2	3140.1	3186.6	24
14-NOV-88	10.4	10.6	10.7	21	86.7	88.6	90.4	21	1322.8	2101.7	3179.0	24
15-NOV-88	10.5	10.6	10.8	24	87.3	88.5	90.4	24	3171.4	3186.8	3201.9	24
16-NOV-88	10.7	10.7	10.8	18	86.8	88.4	89.9	18	2694.8	3073.7	3171.4	15
17-NOV-88	10.7	10.7	10.8	12	88.3	89.1	89.9	12	3081.0	3091.0	3095.9	13
18-NOV-88	10.7	10.8	11.0	12	86.8	88.6	90.2	12	3171.4	3184.5	3201.9	11
19-NOV-88	11.0	11.1	11.3	24	87.2	88.8	90.9	24	3126.0	3154.0	3171.4	24
20-NOV-88	11.1	11.2	11.3	18	87.8	88.9	90.0	18	3129.7	3160.9	3171.4	21
21-NOV-88	11.2	11.3	11.7	24	88.4	89.4	92.1	24	3171.4	3387.9	3493.2	24
22-NOV-88	11.7	12.0	12.2	17	91.6	92.9	94.3	17	2955.7	3275.6	3436.8	21
23-NOV-88	12.1	12.2	12.4	24	91.4	93.0	94.5	24	2640.5	3003.4	3232.6	24
24-NOV-88	12.2	12.4	12.5	24	90.4	92.1	94.5	24	2791.7	3134.7	3232.6	24
25-NOV-88	12.5	12.6	12.7	24	89.2	90.9	92.9	24	2763.8	2961.6	3232.6	24
26-NOV-88	12.7	12.8	12.9	18	90.9	92.5	94.6	18	3171.4	3188.8	3213.4	18
27-NOV-88	12.8	12.8	12.9	24	91.4	92.8	94.6	24	2919.6	3055.7	3171.4	24
28-NOV-88	12.8	12.8	12.9	24	95.0	95.5	96.7	24	2919.6	2968.3	3077.2	24
29-NOV-88	12.6	12.8	12.8	12	94.3	95.4	96.1	12	3114.7	3350.8	3420.8	13
30-NOV-88	12.9	12.9	12.9	3	94.6	95.3	95.6	3	2923.2	3006.4	3175.2	5
GRAND MONTHLY MEAN	11.2	11.3	11.5		89.5	90.9	92.5		2996.8	3172.5	3320.0	

\# A day with less than 24 values.

**** No data values for that day.

a A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.

Computer down.

SUMMARY OF DAILY AMQM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-DEC-88 to 31-DEC-88

DAY	TEMPERATURE C				pH units				SPECIFIC CONDUCTANCE us/cm			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-DEC-88	1.2	1.5	2.0	18	6.7	6.7	6.7	18	66.4	66.4	66.4	18
2-DEC-88	0.8	1.1	1.6	15	6.6	6.6	6.7	15	66.4	67.4	70.3	15
3-DEC-88	0.8	1.1	1.6	24	6.5	6.6	6.7	24	66.4	66.7	70.3	24
4-DEC-88	0.8	1.2	1.6	24	6.7	6.7	6.7	24	62.5	67.2	70.3	24
5-DEC-88	0.0	0.1	0.4	18	6.5	6.6	6.7	18	66.4	69.2	70.3	18
6-DEC-88	0.0	0.0	0.0	24	6.4	6.5	6.7	24	66.4	71.8	74.2	24
7-DEC-88	0.0	0.4	1.2	24	6.7	6.7	6.7	24	70.3	71.3	74.2	24
8-DEC-88	0.0	0.7	1.2	18	6.5	6.6	6.7	18	70.3	76.2	78.1	18
9-DEC-88	0.0	0.1	0.4	24	6.5	6.5	6.6	24	78.1	82.7	85.9	24
10-DEC-88	0.0	0.0	0.0	18	6.5	6.5	6.6	18	82.0	84.2	85.9	18
11-DEC-88	0.0	0.0	0.0	24	6.5	6.6	6.9	24	82.0	87.2	89.8	24
12-DEC-88	0.0	0.0	0.0	24	6.5	6.6	6.7	24	89.8	91.3	93.7	24
13-DEC-88	0.0	0.0	0.0	24	6.5	6.6	6.7	24	85.9	90.2	93.7	24
14-DEC-88	0.0	0.0	0.0	18	6.7	6.8	6.9	18	93.7	102.2	113.3	18
15-DEC-88	0.0	0.0	0.0	24	6.8	6.8	6.9	24	89.8	95.0	105.5	24
16-DEC-88	0.0	0.0	0.4	24	4.0	6.8	7.2	24	3.9	90.5	97.6	24
17-DEC-88	0.0	0.2	0.4	15	7.1	7.1	7.2	15	97.6	98.9	101.6	15
18-DEC-88	0.0	0.0	0.4	24	7.1	7.1	7.1	24	97.6	99.8	101.6	24
19-DEC-88	0.0	0.0	0.0	24	7.1	7.1	7.1	24	101.6	103.5	105.5	24
20-DEC-88	0.0	0.3	0.4	24	7.1	7.1	7.1	24	101.6	104.5	109.4	24
21-DEC-88	0.0	0.4	0.4	24	7.1	7.1	7.2	24	97.6	102.5	109.4	24
22-DEC-88	0.0	0.4	0.4	18	7.1	7.2	7.2	18	101.6	107.8	117.2	18
23-DEC-88	0.0	0.1	0.4	24	7.1	7.1	7.2	24	93.7	103.2	117.2	24
24-DEC-88	0.0	0.4	0.4	6	7.1	7.1	7.1	6	93.7	93.7	93.7	6
25-DEC-88	0.0	0.9	1.2	21	7.1	7.2	7.2	21	93.7	100.2	113.3	21
26-DEC-88	0.0	0.3	0.8	18	7.2	7.2	7.2	18	101.6	101.6	101.6	18
27-DEC-88	0.0	0.2	0.4	18	7.0	7.2	7.3	18	97.6	105.5	117.2	18
28-DEC-88	0.0	0.4	0.8	24	7.0	7.1	7.1	24	93.7	103.5	125.0	24
29-DEC-88	0.0	0.3	0.8	18	7.1	7.2	7.2	18	97.6	103.9	109.4	18
30-DEC-88	0.0	0.2	0.4	21	7.0	7.1	7.2	21	101.6	107.5	117.2	21
31-DEC-88	0.4	0.4	0.4	15	7.0	7.1	7.1	15	101.6	102.6	105.5	15
GRAND MONTHLY MEAN	0.1	0.3	0.6		6.7	6.9	7.0		84.3	90.9	96.3	

@ A day with less than 24 values.

**** No data values for that day.

SUMMARY OF DAILY AMGM VALUES FOR THE ST. CROIX RIVER AT MILLTOWN

Period from 01-DEC-88 to 31-DEC-88

DAY	DISSOLVED OXYGEN mg/l				DISSOLVED OXYGEN % saturation				FLOW cf/s			
	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS	MIN.	MEAN	MAX.	HRS
1-DEC-88	12.8	12.9	13.0	18	93.4	95.2	96.7	18	3232.6	3250.0	3271.3	18
2-DEC-88	12.8	12.8	12.9	15	92.4	94.0	95.6	15	3040.1	3179.5	3232.6	12
3-DEC-88	12.8	12.8	12.9	24	92.4	93.7	95.6	24	2934.0	3074.1	3186.6	24
4-DEC-88	12.8	12.9	13.2	24	93.4	94.8	95.7	24	2520.9	2929.7	3171.4	24
5-DEC-88	13.0	13.1	13.2	18	92.1	92.7	94.2	18	2459.2	2831.0	3126.0	21
6-DEC-88	13.0	13.1	13.2	24	92.1	92.6	93.2	24	2511.1	2581.5	2694.8	24
7-DEC-88	12.9	13.0	13.2	24	92.1	93.2	95.1	24	2243.9	2525.4	2681.2	24
8-DEC-88	12.8	12.9	13.1	18	92.0	93.5	95.1	18	1742.3	2039.3	2246.9	18
9-DEC-88	12.8	12.9	13.1	24	91.0	91.9	93.7	24	1839.4	1947.2	2034.8	24
10-DEC-88	12.8	13.0	13.1	18	91.0	91.9	92.6	18	1698.6	1994.2	2116.1	18
11-DEC-88	12.9	13.0	13.2	24	91.6	92.3	93.2	24	1811.7	1893.0	2096.2	24
12-DEC-88	13.2	13.2	13.3	24	93.8	94.0	94.3	24	2087.7	2178.8	2424.0	24
13-DEC-88	13.2	13.3	13.3	24	93.8	94.2	94.3	24	1045.8	1719.8	2087.7	24
14-DEC-88	13.2	13.2	13.3	18	93.2	93.6	94.3	18	1149.7	1782.7	2404.9	18
15-DEC-88	13.2	13.3	13.5	24	93.2	94.6	96.0	24	2021.1	2056.6	2311.1	24
16-DEC-88	2.2	13.0	13.7	24	15.6	91.8	97.1	24	2010.1	2031.9	2079.3	24
17-DEC-88	13.6	13.7	13.8	15	96.5	97.7	98.7	15	1885.5	2010.8	2099.0	15
18-DEC-88	13.5	13.5	13.7	24	95.4	95.8	97.1	24	1801.7	1847.7	1882.9	24
19-DEC-88	13.5	13.5	13.6	24	95.4	96.0	96.5	24	1801.7	1841.4	1943.0	24
20-DEC-88	13.2	13.4	13.5	24	94.2	95.7	97.0	24	1789.2	1841.8	1977.7	24
21-DEC-88	12.8	12.9	13.1	24	91.4	92.7	93.7	24	1422.7	1740.0	1831.8	24
22-DEC-88	12.8	13.0	13.2	18	92.0	93.2	94.8	18	1381.1	1691.6	2076.5	18
23-DEC-88	13.2	13.3	13.4	24	93.2	94.7	95.4	24	2076.5	2113.9	2191.7	24
24-DEC-88	12.9	13.1	13.2	6	92.6	93.6	94.8	6	1872.6	1972.4	2082.1	7
25-DEC-88	12.5	12.5	12.6	21	90.2	90.9	92.3	21	1991.2	2013.8	2026.5	18
26-DEC-88	12.4	12.6	12.8	18	88.7	90.2	91.4	18	1875.2	1883.2	1893.3	20
27-DEC-88	12.2	12.6	13.0	18	87.5	90.1	92.1	18	1550.7	1825.7	1945.7	18
28-DEC-88	12.1	12.3	12.5	24	87.0	88.1	89.6	24	1831.8	1848.6	1872.6	24
29-DEC-88	12.4	12.7	13.0	18	89.6	91.0	92.1	18	1816.7	1863.9	1906.3	18
30-DEC-88	12.5	12.9	13.3	21	89.8	92.0	94.3	21	1776.8	1932.3	2096.2	24
31-DEC-88	12.6	12.8	12.8	15	90.3	91.3	92.0	15	1732.6	1734.5	1749.7	13
GRAND MONTHLY MEAN	12.5	13.0	13.2		89.6	93.1	94.5		1966.3	2134.7	2281.9	

\# A day with less than 24 values.

**** No data values for that day.

∂ A value for dissolved oxygen is approaching the objective. (5.0 mg/l or 60% saturation)

? Daily mean flow is below 750 cf/s.